

**OLIVE VIEW-UCLA MEDICAL CENTER
POLICY & PROCEDURE**

**NUMBER: 1577
VERSION: 2**

- SUBJECT/TITLE:** **ARTERIAL PRESSURE MONITORING CATHETER: INSERTION AND MAINTENANCE (ADULT)**
- POLICY:** Registered Nurses who have been trained in this procedure may set-up and prepare the equipment, assist the physician, and monitor the procedure. The physicians post-graduate, and the CRNA trained in this procedure, may insert the catheters.
- PURPOSE:** To provide a guideline for insertion and maintenance of arterial pressure monitoring catheters.
- DEPARTMENTS:** Medicine, Nursing
- DEFINITIONS:** An intra-arterial catheter connected to a pressure monitoring system permits continuous arterial blood pressure assessment and withdrawal of arterial blood samples. Catheters are usually 20 gauge or 18 gauge (femoral) and are most frequently inserted into the radial artery, under sterile conditions, by a physician. Complications include trauma during insertion and infection.
- EQUIPMENT LIST:** **ASSEMBLY OF LINES:**
- Pressure bag.
 - Normal Saline – 500mL.
 - Single lumen pressure tubing with transducer.
 - Transducer holder (optional).
 - Pressure monitor cable to hemodynamic monitor (pressure module).
 - IV labels.
- PATIENT PREPARATION:**
- Towels (for positioning).
 - Arm board.
 - Over-bed table.
 - Soft restraint (optional).
 - Tape (cloth).
 - Clippers for hair removal.
 - Antiseptic solution/swabs (Chlorhexidine or Iodine swabs).
- STERILE FIELD:**
- Fenestrated Drape.

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Sterile towel.
(2) 10 mL syringes.
Arterial catheter set: 20g – 1 ¾ “radial or 18g – 4 ¼” femoral.
4x4 sterile gauze sponges.
18g and 25g sterile needles.
Sterile needle holder.
Sterile gown, sterile gloves, facemasks, caps.
1% - 2% Lidocaine (without Epinephrine).
3 mL syringe with needle.
Mayo Stand or over-bed table.
3-0 silk suture with needle, or
Arterial catheter securement/anchoring device.

SITE DRESSING/ANCHORING:

Chlorhexidine Dressing (Protective disc with CHG)
Transparent occlusive dressing (preferable),
Plastic tape.
Arm board (optional, but suggested for radial site).
Soft restraint (optional).
*****Physician/CRNA to suture arterial line in place or use arterial catheter securement/ anchoring device.**

PROCEDURE: STEPS/KEY POINTS:

PATIENT PREPARATION:

PHYSICIAN:

1. Explain procedure to patient and family.
2. Obtain informed consent from patient or sign Certificate of Emergency and obtain signature of second physician.
3. Determine appropriate site. Always consider the non-dominant hand. Perform Allen’s Test prior to insertion of radial artery catheter.
 - The Allen’s Test assesses collateral circulation of the hand when radial artery is occluded. Refer to Allen Test Procedure.

NURSE OR PHYSICIAN:

1. Gather equipment and sterile supplies; place at bedside.
2. Position site for insertion utilizing table, arm board and/or towel props as needed.

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ASSEMBLY OF LINES:

NURSE:

1. Perform hand hygiene and don personal protective equipment as appropriate.
2. Place equipment needed for set-up on clean, flat area.
3. Obtain 500mL NS IV solution, Avoid dextrose solutions. Label bag with patient's name, date time, and preparer's initials.
4. Put on facemask.
5. Open sterile monitoring package containing single lumen pressure tubing with transducer.
6. Connect pressure tubing and transducer tubing; check all connections for tight fittings.
 - Needleless Arterial Pressure Monitor Transducer & Tubing available.
7. Spike flush bag with tubing.
8. Put flush bag into pressure bag; place on IV pole.
9. Release flow restrictor at transducer and fill tubing.
 - Observe for air bubble formation, especially secondary to turbulence in drip chamber (readjust fluid level in chamber if necessary). Observe for air bubbles at stopcock connection and in transducer chamber. Gentle tapping will release air bubbles to tubing. All bubbles should be flushed from system.
13. Label tubing per hospital policy. Label drip chamber as "arterial" (red label).
14. Place assembled equipment at bedside.
15. Attach transducer electrical connection to pressure monitoring cable.
16. Turn on pressure monitor and calibrate.
17. After calibration change fenestrated air-port caps on stopcock to a non-vented (leur-lock type) cap (enclosed in transducer kit).

PREPARE STERILE FIELD:

PHYSICIAN OR NURSE:

1. Place equipment at bedside.
2. Primary physician and nurse or second physician at bedside must wear a cap and mask. The primary physician must wear a sterile gown. Any additional personnel at bedside must wear a mask.
3. Perform hand hygiene.
4. Set up sterile field on sterile towel using over-bed table or Mayo Stand close to the insertion site.

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5. Place on field aseptically: Sterile bowl, arterial catheter, (2) 4x4 gauze, fenestrated drape, (2) 10mL syringes, 18g and 25g sterile needles, sterile needle holder, 3-0 silk suture.
6. Add 250mL NS to Sterile bowl.
7. Position patient so that the site of insertion, sterile field, bed and lighting will assure safe and easy access by physician.

CATHETER INSERTION:

PHYSICIAN:

1. Perform hand hygiene.
2. Prep skin with antiseptic solution (Iodine solution or chlorhexidine), clip hair as necessary.
 - Let antiseptic solution dry completely prior to puncturing skin.
3. Don sterile gloves.
4. Create sterile field with fenestrated drape.

NURSE:

5. Provide anesthesia solution as needed (1-2% Lidocaine without epinephrine is suggested).
6. Place pressure tubing set up for easy access.
7. On monitor, check waveform for electrical connection.

PHYSICIAN:

8. Inject anesthesia as needed with 10mL syringe and needle provided.
9. Flush catheter with saline from sterile bowl using 10mL syringe provided.
10. Insert arterial catheter.

PHYSICIAN OR NURSE:

11. Connect pressure tubing to catheter, tighten non-vented (leur-lock type) cap securely.
12. Check monitor for presence, quality, and height, flush. Adjust scales and reposition catheter as needed.

PHYSICIAN:

13. Suture catheter and tubing in place.
14. Clean site of excess blood.

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15. Remove and dispose of all sharps on field.

DRESSING/ANCHORING:

NURSE:

1. Dress site and secure with tape as needed. Label dressing appropriately (date, time & initials).
 - Transparent occlusive dressing does not need to be changed if it remains intact & there is no S&S of infection. If gauze dressing is used, change every 24 hours and assess site.
2. Level, Zero, and Calibrate.
 - Transducer must be level to the phlebostatic axis.
 - a. Remove excess tubing and tape transducer near insertion site of patient (leave 2 stopcocks beside each other).
“OR”
 - b. Place transducer on holder and adjust to correct height.
3. Recalibrate transducer.
 - Refer to PATC & Hemodynamic Monitoring Procedures for level, zero, and calibration.

MAINTENANCE OF ARTERIAL PRESSURE LINES:

1. Transducer flush system delivers 3-6mL of IV fluid per hour.
2. Flush bag solution must be counted in Intake and Output.
3. Keep flush bag inflated to 300mm/Hg.
4. All stopcock ports must be covered with sterile non-vented (leur-lock type) caps.
5. Replace non-vented (leur-lock type) cap with new cap after each use of stopcock port.
6. Evaluate insertion site every two (2) hours and document.
 - Notify MD if S&S of infection.
7. Pressure tubing to be changed every 96 hours.
8. Arterial catheter site to be changed by MD every 96 hours (4 days) unless S&S of infection.
 - Document when MD has been informed, after initial 96 hours, of need for site change.
9. Change solution bag every 24 hours.
10. Monitor waveform constantly for quality, dampening, whip.
11. Assess peripheral vascular circulation of the extremity to be used for arterial cannulation, including assessment of color, temperature, presence and fullness of pulses capillary refill, and motor and sensory function (as compared with opposite extremity). Notify physician as soon as extremity

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ischemia is noted. Physician will notify Vascular Surgeons/consult immediately. *Discontinue arterial line if vascular surgeons cannot evaluate within 30 minutes.

12. Correlate and document arterial line vs. cuff pressure every 8 hours.
13. **DO NOT** cap/heplock arterial line. (Even for transport)

REMOVAL OF ARTERIAL CATHETER:

1. Turn off continuous flush.
2. Perform hand hygiene, don PPE as appropriate, and don non-sterile gloves.
3. Aspirate blood from the arterial line.
4. Apply pressure distal to the insertion site.
5. Remove sutures.
6. Remove the arterial catheter.
7. Apply pressure with a sterile 4x4 gauze for 5 minutes (for radial or ulnar artery) or longer for other insertion sites. Longer periods of direct pressure may be needed in patients receiving systemic heparin, thrombolytics or patients with catheter in larger arteries (e.g., femoral artery).
8. Check site for signs of bleeding every 5 minutes X 4.
9. Apply a pressure dressing to the insertion site.
10. Remove gloves and wash hands.

DOCUMENTATION:

NURSE: (Follow documentation guidelines as per Unit/Area).

Documentation in medical record:

1. Sample of waveform tracing showing calibration.
2. Type of catheter, size, site, date, and time of insertion.
3. Tubing and dressing time change.
4. Record flush bag fluids in intake/output.
5. Patient/family education given, and their response.
6. Procedure and patient's tolerance.
7. Nursing Care Plan that includes "Risk for Infection."

PHYSICIAN:

1. File completed consent form.
2. Write procedure note.
3. Document findings of Allen's Test.
4. Document consent has been obtained with the risks, benefits, and alternatives explained/discussed with patient and/or family members.

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5. Document therapy orders in the medical record.

References:	
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Lynn-McHale Wiegand, D. and Carlson, K. (2005). <u>AACN Procedure Manual for Critical Care</u> (5 th Ed.). Philadelphia: W.B. Saunders Co.	
Hospital Infection Control Practices Advisory committee (1996). Guidelines for prevention of intravascular device-related infections. <u>Infection Control and Hospital Epidemiology</u> , 17 (7).	
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