

NATIONAL INSTITUTES OF HEALTH
WARREN GRANT MAGNUSON CLINICAL CENTER
NURSING and PATIENT CARE SERVICES

Standard of Practice: Care of the Patient Requiring Continuous Hemodynamic Monitoring

Essential Information

- See AACN Procedure Manual for complete information regarding hemodynamic monitoring.

I. ASSESSMENT

- A. Prior to insertion of a venous or arterial catheter:
 - 1. Assess vascular status distal to potential insertion site
 - 2. Review relevant laboratory data including coagulation and CBC results.
- B. On insertion of a catheter:
 - 1. Level and zero transducer at phlebostatic axis
 - 2. If sedation is given, the nurse monitors the patient in accordance with MAS 97- # Administration of Sedation.
 - 3. Observe ECG for dysrhythmias during pulmonary artery catheter (PAC) placement.
 - 4. Observe for signs and symptoms of distress, particularly respiratory distress as may be seen with central line insertion
 - 5. Obtains opening pressures and tracings for each waveform noting proper configuration, dampening, and catheter whip.
 - 6. For PACs, measure external catheter length at locking device.
 - 7. Confirm with an LIP that a medical order has been entered requesting a chest x-ray post-central line placement.
- C. After insertion of a catheter:
 - 1. At least every 4 hours:
 - a. Verify clinical alarms are on and limits are appropriate as determined by patient's condition and age.
 - b. Verify there is an adequate fluid level/volume in the flush bag.
 - c. Verify that pressure bag is inflated to 300 mm Hg. In most cases, pediatric patients less than 20kg should have hemodynamic lines placed on an infusion device such as an infusion pump or syringe pump.
 - d. For pediatric patients less than 50kg, hemodynamic lines will be flushed via syringe at the transducer, not with the pig-tailed flush device.
 - e. Obtain pressure readings at phlebostatic axis level.
 - f. For PAC, obtain cardiac output, cardiac index, systemic vascular resistance, pulmonary vascular resistance, central venous pressure, and SVO₂ readings.
 - g. Obtain PAC wedge pressure reading, averaging the a-wave or using the Z-point method
 - h. Monitor neurovascular and peripheral vascular assessments of the cannulated extremity.
 - 2. At least every eight hours:
 - a. Zero and level all pressure transducers
 - b. Obtain occlusion cuff pressure on arterial lines

- c. For PACs, measure external catheter length at locking device and assess that catheter sleeve is not taped.
- D. Prior to insertion of and during discontinuation of PACs:
 1. Provide an alternate IV access.
 2. Monitor cardiac rhythm for dysrhythmias.
- E. After discontinuation of a catheter:
 1. Assess insertion site for signs of complications such as hematoma, swelling, infection, bleeding, etc.
 2. Visually inspect catheter to validate it was removed intact.
 3. When an arterial catheter is removed, pressure should be held to the site for at least 5 minutes. A pressure dressing should be applied to the site for at least 6 hours. Assess neurovascular and peripheral vascular status after removal every 15 minutes x 4, every 30 minutes x 2 and every 1 hour x 2.

II. INTERVENTIONS

- A. Site care and dressing changes are provided in accordance with SOP: Venous Access Devices. Flush solution bags are changed every 72 hours.
- B. Medical supplies used in a hemodynamic set-up including IV tubing, flush bag solutions, transducer, and pressure tubing down to the catheter hub are changed every 72 hours.
- C. Cover the open end of all stopcocks with a dead-end cap.
- D. Notify physician of complications uncorrected with troubleshooting of the system
- E. Patient/family education regarding reasons for monitoring

III. DOCUMENTATION

- A. Documentation should be on an approved electronic record or other approved medical record form
- B. For all hemodynamic catheter placements, document:
 1. Date, time, and site of catheter insertion
 2. Length, size and type of catheter
 3. Clinical alarms on, set, and checked every 8 hours
 4. The patient's tolerance of the procedure and/or complications
 5. Zero and leveling at phlebostatic axis was performed
 6. Type of flush solution
 7. The amount of both continuous infusion fluid and all flushes must be documented for all pediatric patients (less than 18 years of age).
- C. For arterial lines:
 1. Peripheral circulation distal to insertion site
 2. Record readings on Flow Sheet as often as clinical situation requires; arterial pressure readings may be recorded on flowsheet without using a strip from the monitor, but a strip must be recorded in the progress notes at least once per shift
 3. Document waveform tracings with date and time of strip and patient's name; label waveform scale diastolic and systolic pressures, and signature
- D. For pulmonary artery catheters and central venous pressure (CVP) catheters:
 1. Confirmation of catheter placement (waveforms, chest x-ray)
 2. Record readings on Flow Sheet and pressure waveforms/interpretations on progress notes as often as clinical situation requires and per physician order

3. A waveform strip must be recorded in the progress notes with each documentation of pressures on the flowsheet
 4. Document waveform tracings with date, time, patient's name, wave identification and evaluation, scale used, and signature of nurse assessing the strip
 5. Length of external catheter in centimeters at locking device for PA catheters.
- E. Upon discontinuation:
1. Date and time catheter removed
 2. Condition of site post-removal
 3. Name of person removing catheter (PA catheters are removed by physician)
 4. Patient's tolerance of procedure and/or complications
 5. Observation of dysrhythmias during or after removal
 6. Peripheral circulation distal to site
- F. Patient/family education provided.

IV. REFERENCES

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- B. Darovic, G.O., (1995) Hemodynamic monitoring: invasive and noninvasive clinical application (2d ed), New York: W.B. Saunders
- C. Smith, JB, Ley, SJ, Curley MAQ, Elixson, EM, Dodds, KM. 1997. Tissue perfusion. In MAQ Curley, P Moloney-Harmon, JB Smith (Eds). Critical Care Nursing of Infants and Children. pp 196-213. Baltimore. W.B. Saunders.
- D. SOP: Care of the Patient with an Arterial Line (Radial or Brachial), NIH/Clinical Center, Nursing and Patient Care Services, 2001.
- E. Critical Care Medicine Department, Critical Care Therapy Section, Hemodynamic Monitoring Procedure.

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