HACKETTSTOWN REGIONAL MEDICAL CENTER

Originator: Ellen O'Reilly, RN
Reviewed by: Elizabeth Fitzgerald, RN

ICU/PACU/ED
(Scope)

TITLE: Arterial Catheter, Insertion and Maintenance

Purpose: To outline the nursing responsibility for inserting, monitoring and caring for a patient with a peripherally inserted arterial catheter.

Supportive Data:

- The preferred artery for arterial catheter insertion is the radial artery. Though the artery is smaller than the ulnar artery, it is more superficial and more easily stabilized during the procedure.
- The femoral artery may be used for arterial catheter insertion.
- The most common complications associated with arterial puncture include pain, vasospasm, hematoma, infection hemorrhage and neurovascular compromise.
- Presence of collateral flow to the area distal to the arterial catheter should be evaluated before cannulation of the artery.
- Along with systolic and diastolic pressures, mean arterial pressures can be obtained. The mean arterial pressure (MAP) is the average arterial pressure during a cardiac cycle. It is calculated automatically by the monitoring system. TI represents the perfusion pressure for blood flow through the cardiovascular system.
- Inserted to provide direct and continuous measurement of peripheral arterial pressure in patient with actual or potential hemodynamic alterations. To obtain readings necessary for safe and effective regulation of vasoactive drug therapy.
- Can be used for frequent blood sampling for arterial blood gas determination or other parameter with less discomfort to the patient and fewer complications than would occur with repeated needle punctures.

Equipment:

Pressure Bag
500 mL Normal Saline with 1000 units Heparin (as long as there are no contraindications for heparin use)
Disposable Transducer Pressure tubing
Transducer cable
Transducer holder
Level
Arterial line kit (either radial or femoral)
Extra Lidocaine 2%
Anitmicrobial solution
Tape
Extra suture set
Extra arterial catheters

Content	
I Insertion	For insertion: 1. Wash hands and utilize universal precautions. 2. Assemble equipment. 3. Assemble transducer system and calibrate system per Policy # 6010/6050.018a 4. Assist physician as requested

	5.	Once positioning is confirmed and physician removes stylet, connect the catheter to the hemodynamic monitoring system.	
	6.	Assist physician with suturing and applying dry sterile dressing.	
	7.	Label site.	
	8.	Use arm board if necessary.	
	9.	Set alarm parameters according to patient's current blood pressure.	Alarms should always be on to detect pulseless electrical activity, hypotension, hypertension, accidental disconnection or removal of the catheter or overdamping of the waveform.
	10.	Run a strip and record baseline pressures.	Confirms digital values.
II. **Monitoring and Patient Care**	1.	Monitor neurovascular and peripheral vascular assessment of the cannulated extremity immediately after catheter is inserted and every 4 hours.	Validates adequate peripheral circulation and neurovascular integrity. Changes in pulses, color temperature or capillary refill may indicate ischemia, arterial spasm or neurovascualr compromise.
	2.	Check arterial line flush system every 1- 4 hours to ensure the following: ➢ Pressure bag is inflated to 300mmHg ➢ Fluid is present in flush bag	Ensures accuracy of pressure waveform and functioning system.
	3.	Monitor waveform for overdamped or underdamped.	Optimal damped system provides an adequate waveform with appropriate blood pressure readings.
	4.	Calibrate system during initial setup and q shift or when system is opened to air or when the accuracy of the readings is in question	Ensures accuracy of the hemodynamic monitoring system
	5.	Observe insertion site for signs of infection	Infected catheters must be removed as soon as possible to prevent bacteremia. Tip should be sent for culture.
	6.	Change catheter site, pressure tubing q96 hours or with each change of the catheter. Change flush bag q 24 hours.	Changing of the system more often may cause contamination and increase the risk of infection.
	7.	Run arterial pressure waveform strip at the start of each shift or whenever there is a change in the waveform.	The printed waveform allows assessment of the adequacy of the waveform.

	8. Monitor hemoglobin and hematocrit daily or whenever a significant amount of blood is lost through the catheter.	Allow assessment of nosocimial anemia.
III Troubleshooting	*Overdamped waveform:*	
	1. Check patient.	
	2. Check that the pressure bag is inflated to 300mm Hg.	
	3. Calibrate (zero) the system, perform dynamic response test. (fast flush).	See figure 56-3B from the AACN manual attached.
	4. If overdampen:	
	➢ Check catheter position	
	➢ Check system for air bubbles and eliminate them if found.	
	➢ Check the tubing for leaks or disconnection and correct the problem if found.	
	➢ Attempt to aspirate and flush catheter.	Assist with the withdrawal of air in tubing or clots that may be at catheter tip.
	Underdamped	
	1. Check system for air bubbles and eliminate them if found.	See figure 56 -3 C from the AACN manual attached.
	2. Check the length of the pressurized tubing.	Ensure that the tubing is minimized.
IV Dressing changes	1. Use same dressing protocol as for central lines.	
V Removal	1. Turn off continuous infusion and turn off monitoring alarms.	Prevents flush solution from leaking and prevents false alarms.
	2. Attach syringe to blood sampling port, turn stopcock off to flush bag, and draw blood back through the tubing.	Ensures there is no clot in the catheter.
	3. Apply pressure distal to the insertion site.	Prepares for removal.
	4. Pull out catheter using sterile 4x4 gauze pad to cover site as catheter is pulled out.	Prevents splashing of blood.
	5. Immediately apply firm pressure with a sterile 4x4 proximal to the insertion site.	Prevents bleeding.
	6. Continue to apply pressure for minimum of 5 minutes for radial or ulnar artery site.	Longer period of direct pressure may be needed to achieve hemostasis in patients receiving systemic heparin or thrombolytics or those with catheter in larger arteries.
	7. Apply a pressure dressing to the insertion site.	A pressure dressing will help prevent rebleeding.

VI. Documentation

1. Peripheral vascular and neurovascular assessments.
2. Date and time of insertion with size of catheter placed.
3. Condition of site.
4. Initial insertion recorded and waveform.
5. Labeled with date and time and pressure readings.
6. Any unexpected outcomes.

References:

Mc Hale, Lynn RN, MSN and Carlson, Karen RN, MN. AACN Procedure Manual for Critical Care 4th Edition. (2001) Saunders. Page 367-377.

Darovic, Gloria RN, CCRN. Hemodynamic Monitoring. (2004) Elsevier Science. Page 86-100.