### TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy</td>
<td>2</td>
</tr>
<tr>
<td>Definitions</td>
<td>2</td>
</tr>
<tr>
<td>Guiding Principles and Values</td>
<td>2</td>
</tr>
<tr>
<td>Procedure</td>
<td>3</td>
</tr>
<tr>
<td>References</td>
<td>5</td>
</tr>
<tr>
<td>Related Documents</td>
<td>6</td>
</tr>
</tbody>
</table>

**THIS IS A POST-ENTRY LEVEL COMPETENCY FOR RESPIRATORY THERAPISTS THAT REQUIRES ASSESSMENT OF COMPETENCY PRIOR TO PERFORMING.**
POLICY

1. Radial Arterial Catheterization is a Post-Entry Level Competency (PELC) for Registered Respiratory Therapists (RRTs) to:

   Initial Competency Assessment
   1.1. Successfully complete the learning module and self-test
   1.2. Successfully insert 5 arterial lines under the direct supervision of a qualified physician

   Annual Competency Reassessment
   1.3. Perform and document three successful arterial line insertions per year or
   1.4. If unable to achieve three successful arterial line insertions per year, then insert two arterial lines under the direct supervision of a qualified physician.

   Note: Documentation of each insertion (including date, time and location) is to be done on the Respiratory Therapy Arterial Catheterization Certification Log

2. A physician’s order is required prior to performing Radial Arterial Catheterization. Only Respiratory Therapists who have been certified to perform arterial catheterization may do soon the order of a physician.

3. Respiratory Therapists insert arterial catheters only into the radial artery.

4. Prior to performing Radial Arterial Catheterization, an RRT or RN is to be available to assist.

DEFINITIONS

Modified Allen’s Test: A test performed prior to radial artery puncture to assess the patency of the ulnar artery and an intact superficial palmar arch.

GUIDING PRINCIPLES AND VALUES

1. Invasion of the arterial circulation is a very common intervention in critically ill patients, second in frequency only to intravenous cannulation. The need for frequent arterial blood gas measurements and continuous blood pressure monitoring are the usual cited reasons for arterial cannulation.

2. With every medical procedure there are associated risks. Estimating these risk and weighing the presumed benefits from the procedure, as well as considering the risk of not performing the intervention, allow caregivers to make reasonable decisions about when to place an arterial catheter.

   2.1. Capital Health patient education pamphlet Arterial Line (IC85-0074) outlines the risks for the patient.

3. The radial artery is the most frequent site of arterial access because of its superficial and predictable location, minimal pain on penetration, ease of cannulation, convenience of securing a cannula and presence of abundant collateral circulation at the wrist and to the digits.
PROCEDURE

Equipment
- Arterial line – prepared and transducer calibrated (See CC 80-005 Arterial Catheter Blood Sampling/Blood Pressure Monitoring/ Catheter Removal)
- Absorbent “Blue Pad”
- Towel
- Mask
- Chlorhexidine
- 1% lidocaine (single dose vials without lidocaine)
- Sterile gloves
- 4cm by 4cm gauze.
- Clear transparent dressing to secure catheter.
- #18 gauge blunt fill needle for withdrawing lidocaine.
- #25 gauge needle for injecting lidocaine.

1. Important Points:
   1.1. Adhere to Routine Practices for protection from blood and body fluids(Refer to IC 04-002 Routine Practices). Consider wearing glasses/goggles.
   1.2. Assess hypotensive patients for the need for fluid resuscitation/inotropic support in order to adequately palpate and cannulate the artery.

2. Special Considerations
   2.1. Consult with the ordering physician if the following conditions exist:
      2.1.1. Circulatory problems.
      2.1.2. PTT greater than 50 sec., and INR greater than 1.5

      *Normal PT 9 to 12 seconds*
      *Normal PTT 26 to 37 seconds*
      *Normal INR 0.9 to 1.1*

      **Note:** It is the Physicians discretion to allow insertion beyond these parameters.

      2.1.3. Patient receiving Warfarin/Coumadin
      **Note:** Coumadin creates its anticoagulant effect by blocking production of the clotting factors, thus time is required for existing circulating factors to be metabolized. Therefore, a radial arterial catheterization may be safely performed within 24-48 hours after the initial dose. When available always refer to P.T./P.T.T.’s.

      2.1.4. Patient receiving IV Heparin.
2.1.5. Patient receiving thrombolytic therapy (i.e.: Activase rt-pa should be considered as potential bleeding risks and should be discussed with the ordering physician.)

2.1.6. There is no collateral circulation through the ulnar artery, verified by Modified Allen’s Test (radial arterial catheterization only).

2.1.7. Consult a physician when platelet count is greater than 20000 10³µl.

2.1.8. Less than sixteen years of age

3. **Precautions/Hazards/and or Complications**

3.1. Monitor for the following conditions:

3.1.1. Infection

3.1.2. Hematoma formation/ vessel laceration

3.1.3. Thrombus formation/ dislodgement

3.1.4. Air embolism

3.1.5. Ischemia distal to insertion site

3.1.6. trauma to adjacent nerves, bones, tendons and soft tissues

4. **Insertion**

**Note:** A maximum of 3 attempts will be made to place an arterial catheter. If unsuccessful, after two attempts to insert the radial artery catheter, consult with the physician to request their attempt for the catheter. If this is not an option, the initial Therapist may make the third and final attempt.

4.1. Ensure another RRT or RN is available to assist with passing of equipment.

4.2. Verify the physicians order, identify the patient and check for drug allergies (E.g.: lidocaine)

4.3. Palpate the radial artery. Perform “Modified Allen’s Test”

4.4. Position the patient’s wrist by placing a rolled towel underneath. Place a blue pad under the patient’s wrist.

4.5. Clean hands.

4.6. Put on mask and sterile gloves.

4.7. Place the #18 gauge needle onto the syringe.

4.8. Withdraw 3cc of lidocaine from single use vial. Remove the needle and replace it with the #25 gauge needle. Place the syringe and needle back on the sterile environment.

4.9. Using chlorhexidine cleanse the insertion site thoroughly in an outward and circular motion. Allow the solution to dry for approximately 30 to 60 seconds.

4.10. Prime the #25 gauge needle with the lidocaine and infiltrate the subcutaneous tissue on both sides of the artery around the proposed site of entry, with approximately 0.5cc’s of lidocaine. (OPTIONAL)
4.11. Palpate the artery; ensure the bevel of the needle/canal is facing up. With the needle/cannula directed against the arterial flow, puncture the skin at approximately a 30 - 60 degree angle.

4.12. Slowly advance the needle and canal until blood return is noted in the hub.

4.13. Advance the needle a small distance further.


4.15. Advance the guidewire into the artery. There should be no resistance when the wire leaves the needle (black mark). If there is, reposition needle and try again; do not withdrawn the guidewire back into needle once it has been advanced.

4.16. Firmly hold the needle in place with one hand, while with the other hand, advance the catheters into the artery using a gentle rotating motion. Advance the catheter all the way up to the hub.

4.17. Remove the needle while holding the catheter in place. Observe pulsatile bloodflow from the cannula.

4.18. Have the assistant continuously flush the arterial line tubing as you connect it to the cannula and carefully secure it tightly.

4.19. Flush the catheter to ensure patency and observe/assess the arterial waveform on the monitor.

4.20. Suture catheter in place and apply clear transparent dressing.

4.21. Clean up the tray, carefully disposing of all sharps, needles etc. Discard all items appropriately.

4.22. Document the procedure in the progress note.

REFERENCES


Florida Hospital, “Arterial Cannulation Module.” 1996


South Shore Regional Hospital, “Arterial Line Insertion,” Policy and Procedure.


University of Alberta Hospital, “Education Program for the Insertion of Arterial Catheters for Respiratory Therapist.” 1996.

**RELATED DOCUMENTS**

**Policies**
- CC 85 065  Radial Artery Puncture
- CC 80 005  Arterial Catheter Blood Sampling/ Blood Pressure Monitoring/ Catheter Removal
- IC 04-002  Routine Practices

**Brochures**
- [Patient Education Pamphlet: Arterial Lines](IC85-0074)

**Other**
- Learning Module – Radial Arterial Catheterization

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