

PR38: Radial Arterial Line Placement

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Applicable To

■ CCP only

Introduction

The use of arterial lines for hemodynamic monitoring and access for blood sampling in high-risk surgical and critically ill patients has become standard practice. Thus, aiding and guiding ongoing care in real time. The most common site for insertion is the radial artery as it is easiest to access and landmark.

Indications

- Identification and monitoring of acid-base disturbances
- Measurement of the partial pressures of oxygen and carbon dioxide
- Assessment of the response to therapeutic interventions
- Hemoglobin quantification and response to intervention

Contraindications

Relative:

- Abnormal Allen's test
- Local infection, thrombus, or distorted anatomy at the puncture site
- Severe peripheral vascular disease
- Active Raynaud's syndrome

Cautions:

- Arterial line placement should be done for ongoing guidance of care and not a singular point of care test
- Supratherapeutic coagulopathy and infusion of thrombolytic agents
- INR ≥ 3
- PTT ≥ 100
- Platelet count $< 50 \times 10^9/L$

Procedure

1. Prime radial arterial line set (with or without VAMP).
2. Normal saline run through arterial line set.
3. Remove white vented caps and replace with blue non-vented caps.
4. Apply pressure infuser 300 mmHg.
5. Connect to monitoring cable.
6. Identify radial artery.
7. Perform modified Allan's test to ensure adequate collateral circulation.
8. Clean insertion site using aseptic technique.
9. Position wrist/hand to allow for access to radial artery.
10. Landmark radial artery for catheter insertion.
11. Using radial artery line catheter, insert at 45° angle until blood return.
12. Use included slide and guidewire to perform Seldinger technique to assist in catheter insertion.

13. Slide catheter off hub while retracting needle (this will be an exposed sharp).
14. Secure line with suturing.
15. Apply Opsite.
16. Attach primed radial artery line.
17. Level the transducer.
18. Zero art line.
19. Turn off to patient.
20. Open line to air.
21. Zero on monitor.
22. Perform square waveform test.
23. Note: In cases where radial artery access is not achievable, alternate sites (i.e., femoral) may be initiated. It is important to note that longer FA catheters must be used as standard RA ones are likely to be too short to be effective.

Notes

- Consider the risk stratification for an invasive procedure including the time associated with insertion and the need for conveyance.
- Consider the use of venous samples when appropriate.
- Arterial samples are often not required if oxygenation is known to be appropriate and SpO2 levels are adequate and reliable.
- Venous blood gas samples can be adapted to determine acid-base status with the appropriate conversions (excluding a reliable PaO2).
- Hemodynamic monitoring may be accomplished with a faster albeit less reliable procedure (NIBP). A risk assessment should be done to determine the need.

References

1. Theodore AC, Clermont G. (2020). Intra-arterial catheterization for invasive monitoring: Indications, insertion techniques, and interpretation. [[Link](#)]
2. Theodore, AC. (2021). Venous blood gases and other alternative to arterial blood gases. [[Link](#)]

