




Technical Review: Arterial Access in the Donor Patient

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Overview

- Significance and magnitude of complications
- Technical aspects of placement
- Preventative strategies
- Practical cases

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Always keep this in mind....


- Complications
 - Arterial Thrombosis
 - Risk increases with decreasing wrist circumference
 - Risk increases rapidly in first 24 hours, than slowly
 - Occult bleeding
 - Cerebral embolization
 - Occurs with vigorous Flushing of radial catheters
 - Gentle irrigation with 1-2 ml boluses should be used
 - Localized infection
 - Risk increases after 72 hours
 - Remove catheter at earliest possible time
 - Provide careful wound and dressing care
 - Accidental Injection of Medications

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General insertion recommendations

- Larger prep is better, more prep is better
- Full sterile garb please
- Full sterile drape
- Be comfortable- eat and empty bladder, if time permits
- Position the bed for maximal efficiency and comfort
- Don't even think about sticking that patient till you're sure about the anatomy



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General insertion recommendations continued

- The wire will touch any exposed non-sterile surfaces
- Terminate the procedure if sterility is violated
- Communicate with the nurse
- Move to another site if no success with 3-5 passes
- 10cm of wire in the vessel is plenty.
- If the wire doesn't pass, the needle and wire should be removed together, or risk shearing or unraveling the wire.

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Skin Care

- Povidone-iodine gel does not prevent line infections
- Entry site abx's decrease bacterial line sepsis, but increase fungal line sepsis, ex. Bacitracin, bactroban etc.
- Plastic dressings may increase infection risk by enhancing bacterial growth
- Skin flora and density of organisms predicts risk for line infection

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ARTERIAL LINES

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WHAT IS AN ARTERIAL LINE?

- AN ARTERIAL LINE IS A CANNULA USUALLY POSITIONED IN A PERIPHERAL ARTERY
- SUCH AS
 - Radial artery
 - brachial artery
 - dorsalis pedis artery
 - femoral artery




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INDICATIONS FOR USING ARTERIAL LINE


- Ease of access
- Continuous monitoring of arterial blood pressure
 - if patient is on inotropic drugs
 - if patient is on vasoactive drug
 - if patient requires frequent arterial blood sampling



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Anatomy

Arterial Circulation of the Hand



- Radial artery first choice for catheterization
- Allen test no longer needed prior to catheter insertion
- Use 20g needle or smaller

Arterial Circulation of the Arm




- Axillary artery third choice
- Not for coagulopathic patients
- Avoid using brachial artery

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Technique


- Technique: Preparation for Arterial Cannulation
 - Image wrist with Ultrasound, if not available
 - Perform Allen Test to confirm collateral circulation
 - Saline syringe
 - Start with 10 cc Syringe with stopcock
 - Draw up 3-5 ml of saline (50 units/ml)
 - Obtain IV catheter
 - Needle of 18 or 20 gauge with plastic cannula
 - Flush with saline
 - Position patients wrist and hand
 - Patient wrist dorsiflexed over towel pad
 - Tape palm and upper forearm to arm board
 - Clean radial entry site
 - Povidone-Iodine solution (betadine) scrub
 - Alcohol scrub
 - Local anesthetic at entry site (DCD only)
 - Small skin wheal (1-2 ml) of Lidocaine 2%



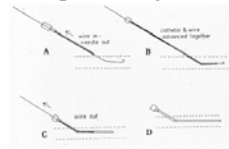
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Technique

- Technique: Placing arterial line
 - Identify radial artery with gentle pressure
 - Needle angled 45 degrees toward arm
 - Enter skin just distal to palpated artery site
 - Slowly advance needle until spontaneous blood enters
 - Guide wire passed into artery
 - Remove needle
 - Advance flushed plastic cannula over top of guide wire
 - Uses modified Seldinger technique



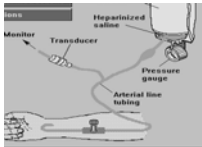
Seldinger Technique



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Technique

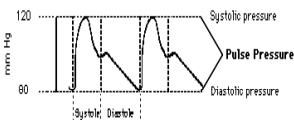
- Attach syringe of saline
- Re-flush cannula with 2 cc saline
- Turn Stopcock to seal artery
- Connect transducer and high-pressure infusion set
- Zero all pressure lines
- Keep small pad under wrist and secure arm board



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THE ARTERIAL WAVEFORM

- The arterial waveform reflects the pressure generated in the arteries following ventricular contraction and can be described as having:-
 - **Anacrotic notch**
 - **Peak systolic pressure**
 - **Dicrotic notch**
 - **Diastolic pressure**



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Pearls (Check list)

- **INDICATIONS**
 - Continuous BP monitoring
 - Serial ABCs of resuscitation
 - Titration of vasoconstrictors or inotropic medications
 - Monitoring during neurologic or cardiovascular surgery
- **RELATIVE CONTRAINDICATIONS**
 - Failed Allen's Test
 - Bleeding diathesis
 - High heparin nomogram
 - Recent systemic thrombolysis
 - Raynaud's Disease
- **ABSOLUTE CONTRAINDICATIONS**
 - Insertion site infection or burn injury
 - Insertion into traumatized artery
 - Site has arterial grafts
 - Evidence of poor limb perfusion or ischemia distal to cannulation
- **REQUIRED EQUIPMENT**
 - Radial line: 20G (pink) cannula - longer is better
 - Femoral line: Single lumen or femoral arterial line kit
 - Guidewire - open and ready for use if required
 - Chlorhexidine to sterilize insertion site
 - OR 3 chlorhexidine swabs
 - Sterile drape, gown and gloves
 - Mask & eye shield
 - Local anesthetic - 1% lidocaine (without epinephrine)
 - 1L bag of saline to hydrate patient wrist - for radial lines
 - Arterial line transducer (set-up pre-procedure)
- **PRE-PROCEDURE TIPS**
 - Ensure normal coagulation profile and platelets
 - Position patient optimally before creating sterile field
 - Be seated for performing radial line insertion
 - Use hand-held Doppler available to confirm pulse presence if difficult to palpate
- **EVIDENCE-BASED BEST PRACTICES**
 - Reducing Line Infections
 - Wash hands prior to procedure
 - Maximum barrier precautions (gown, gloves, mask, goggles, cap, full drape)
 - Daily Review of line necessity
- **POST-PROCEDURE**
 - Appropriate dressings done by nursing staff
 - Square-wave test to ensure no over- or under-damping
 - Daily assessment of good distal perfusion

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Pearls

Seldinger Technique

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Pearls

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