Radial to Coronary Anatomy

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Disclosures

Consultant:

• Bard Medical
Why Transradial? *Radial access provides several well-documented benefits over other access techniques, which creates a compelling reason for its use in diagnostic and therapeutic intervention*

Studies showed

- Reduced incidence of major access complications
- Early sheath removal
- Superficial location permits easy hemostasis
- Decreased time to ambulation with greater patient mobility
- Decreased post-procedure cost
- Greater patient comfort

Recent study shows reduced **MORTALITY** in ACS patients compared to femoral access
Transradial Advantages

- Reduction in Vascular Access Site Complications
- Patient Comfort and Faster Ambulation
- Reduction in Cost per Admission
Patient Preference

- Reduced Length of Stay
- Early Ambulation
- Patient comfort post procedure
- Reduced VAC
- Preservation of Patient Modesty
Common Hurdles with Transradial

• In addition to the common hurdles, it is important to understand the challenges associated with radial access.
• Most can be managed with proper planning.

- Learning Curve
- Length of Set Up
- Support Staff
- Resistance to New Technique
- Length of Procedure (Initially)
- Inability to use Larger Equipment
Patient Selection

• Patient selection criteria depend on the operator’s experience with transradial access

• Two tracks for patient selection
  • The first 200 patients while learning the approach
  • After that...
Patient Selection: Learning

- Hemodynamically stable
- Easily palpable, strong radial pulse
- Patients to anticipate challenges
  - Elderly (≥70 years of age) hypertensive patients
    - Often have dilatation and/or distortion of the aortic arch, which makes entry into the ascending aorta difficult
  - Short stature
  - Acute coronary syndrome
  - Bypass graft lesions
  - Unprotected left main stenosis
  - Chronic total occlusions
  - Peripheral vascular lesions
Patient Selection: Experienced Radialist

Any coronary angiography or PCI unless excluded or contraindicated

Exclusion criteria may vary by lab

- Absence of a radial pulse
- Absence of functional collaterals between radial and ulnar arteries, as judged by the modified Allen test
- Arteriovenous shunt for renal dialysis on the procedure forearm
- Raynaud’s phenomenon
- Any procedure that requires larger than an 6F catheter
Contraindications

Abnormal Allen test

Planned coronary artery bypass graft surgery with radial conduits

Patients with known upper extremity vascular disease

Patients with Buerger’s disease, severe Raynaud’s phenomenon, or other forms of upper extremity peripheral vascular disease

Patients may also be contraindicated for the devices used in a transradial access

Right heart catheterization is not an excuse for not using the radial approach when additionally coronary evaluation is needed

Right heart catheterization can be performed via the antecubital vein or Right Internal jugular
Dual blood supply to the hand

Radial runs a Superficial course

Radial surrounded by boney or tendinous structures
Radial separate from major veins and nerves
Perfusion Tests – The Allen’s Test

1. Pressure is applied over the ulnar and the radial arteries so as to occlude both of them.
2. The hand is elevated and the patient/person is asked to make a fist for about 30 seconds.
3. Still elevated, the hand is then opened. It should appear blanched (pallor can be observed at the finger nails).
4. Ulnar pressure is released and the color should return in 7 seconds.
5. Inference: Ulnar artery supply to the hand is sufficient and it is safe to cannulate the radial

- If color does not return or returns after 7 seconds, then the ulnar artery supply to the hand is not sufficient and the radial artery therefore cannot be safely accessed/cannulated.
Perfusion Tests – The Barbeau Test

Requires finger plethysmography, clip the sensor to the thumb and confirm normal tracing and pulse oximeter reading.

Compress the radial and ulnar artery. The plethysmographic signal will be replaced by a flat line.

Release pressure over the ulnar artery and watch for the tracing and pulse oximetry reading. Immediate return of a normal pulsatile waveform suggest a normal (positive) test indicating the presence of collaterals.
Perfusion Test – Waveform Assessment

Which Arm?

• Labs are more suitable for access from the right arm, however
  • Left radial approach is similar to the femoral approach because it involves entering the ascending aorta from the aortic arch\(^1\)

• Right radial approach is different, as it involves a vertically downward approach to the ascending aorta, completely excluding the aortic arch\(^1\)

• Use of the left arm requires a reconfiguration of the table or substantial adduction of the arm to accommodate positioning of the operator on the patient’s right side\(^2\)
  • Left arm is common in patients with CABG grafts because of easy access to the left internal mammary artery
Catheterization Lab Setup

• Configure the room so that it is comfortable for the patient and functional for the clinician
• Configuring the table
  • In place of a regular arm board, the use of an oversized Plexiglas® rectangular board (3 feet by 4 feet) provides support for the patient’s arm and the interventional equipment
Catheterization Lab Setup (cont)

Other arm placement options
Catheterization Lab Setup (cont)

- Other arm placement options
Patient Positioning

- Position the arm so that the wrist is hyperextended
- Support it using a rolled towel\(^1\) or one of several available arm devices
- Radiation exposure may be significantly reduced by positioning the arm beside the body, thereby approximating the location of the femoral artery
Patient Preparation

• Access the radial artery at least 10 mm proximal to the styloid process and the ulnar styloid process (R-U line) based on analysis of RA bifurcations¹
• Prepare the site using sterile technique²
• Drape the site²
• Anesthetize the site with 1% lidocaine used sparingly (0.5 to 1 mL with skin infiltration only) to minimize radial artery manipulation and spasm³
• Locate any noninvasive blood pressure cuffs on the contralateral arm⁴
Normal Radial Anatomy

• The radial artery originates at the bifurcation of the brachial artery just below the bend of the elbow, passing along the radial side of the forearm to the wrist
Normal Brachial to Subclavian Anatomy

• The brachial artery connects the radial and ulnar arteries to the axillary artery, which in turn joins the subclavian
Normal Aortic Arch

- The left subclavian comes directly off the arch of aorta
- The right subclavian originates from the innominate artery
When it comes to radials you don’t have to panic like this guy!
Or worry about walking into your control room and finding this guy
Conclusion

• Develop a plan for patient selection
• Agree upon which standard you will need to evaluate dual blood supply to the hand
• Evaluate cath lab setup for physician preference for both right and left radial access
• Understand your anatomy
• Recent study shows reduced MORTALITY in ACS patients compared to femoral access
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