Radial Access and PAD Treatment

Janak Bhavsar, MD
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Disclosures

- No relevant disclosures

- No Actual or Potential Conflict of Interest in this Presentation
Acknowledgements

- Terumo Medical

- Cook Medical
Transradial Access

- Bleeding Risks
- Patient Comfort
  - Early Ambulation
- Same Day discharge after PCI
Transradial Advantages

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

For patients with only one complication, vascular complications were more common than all others combined (4.9% vs 3.3%).

Estimates of the adjusted incremental hospital costs of treating any acute complication varied from $4k-$33k per patient.
Reduction in Bleeding Complications

Retrospective analysis of 38,872 patients
TRA showed 50% Reduction in Transfusion Rate
TRA reduced 1yr Mortality from 3.9% to 2.8%

TRA n = 3507 TFA n =3514
STEMI radial showed 40% Reduction in primary outcome
STEMI/ACS radial showed 63% Reduction in Major Vascular Complications

STEMI TRA (n = 500) vs. TFA (n = 501)
62% Reduction of Access site bleeding complications with TRA vs. TFA

*The Association Of Arterial Access Site At Angioplasty With Transfusion And Mortality The M.O.R.T.A.L Study: (Mortality benefit of Reduced Transfusion After PCI via the Arm or Leg); Alex J Chase, Eric B Fretz, William P Warburton, W Peter Klinke, Ronald G Carere
*Effects of Radial Versus Femoral Artery Access in Patients With Acute Coronary Syndromes With or Without ST-Segment Elevation. Shamir R. Mehta, MD, MSC,* Sanjit S. Jolly, MD, MSC
*Radial Versus Femoral Randomized Investigation in ST-Segment Elevation Acute Coronary Syndrome The RIFLE-STEACS (Radial Versus Femoral Randomized Investigation in ST-Elevation Acute Coronary Syndrome) Study. Enrico Romagnoli, MD, PHD,* Giuseppe Biondi-Zoccai, MD,† Alessandro Sciahbasi, MD
Economic Benefit of Transradial

Costs of Transradial Percutaneous Coronary Intervention

Key Points:

• Study shows transradial PCI saves over $830 (adjusted) per patient vs. transfemoral procedures.
  – 12% due to reduction in bleeding
  – 50% due to reduction in LOS

• Ex.: Potential for $160,000 in cost savings at a facility that does 1,000 PCI’s with a 20% TRI adoption rate.
Common Hurdles with Transradial

- Learning Curve
- Length of Procedure (Initially)
- Length of Set Up
- Support Staff Resistance to New Technique
- Inability to use Larger Equipment
Anatomy and Perfusion Tests
Arterial Anatomy

- Dual blood supply to the hand
- Radial runs a Superficial course
- Radial surrounded by bony 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 Test – Waveform Assessment

- **Type A**: No damping of pulse tracing immediately after radial artery compression (15%)
- **Type B**: Damping of pulse tracing (75%)
- **Type C**: Loss of pulse tracing followed by recovery of pulse tracing within 2 minutes (5%)
- **Type D**: Loss of pulse tracing without recovery within 2 minutes (5%)

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Transradial Access Considerations

Avoid

- Absence of Radial Pulse
- Ischemic Perfusion Test
- Presence of Arterio-venous Fistula

Assess Risk vs. Benefit

- Very Small radial Artery (palpation or ultrasound)
- Pathology in Proximal Vessel (ex. subclavian stenosis)
- Raynaud’s Phenomenon
Using a towel to slightly hyperextend the wrist.
Radial or Brachial Drape to position the area
Double Wall Technique

Puncture artery, such as the radial artery, with the bevel pointing upward on the SURFLO® needle.

Push the needle along the line of the arterial pulsations and watch for the backflow of blood in the hub of the needle.
Double Wall Technique

Push the needle forward to counter puncture the artery.

Remove the needle and leave behind the plastic cannula. Slowly pull back the plastic cannula and watch for free backflow of blood. Free flow of blood = proper intraluminal placement.
Double Wall Technique

Guidewire Insertion

Insert the 0.021”/0.025” wire into the artery through the plastic cannula.

Once the guidewire is well inside the artery, remove the plastic cannula and leave behind the wire.
Double Wall Technique

Sheath Insertion

Insert the sheath over the wire. If there is some resistance, insert the sheath using a corkscrew motion.

Remove the sheath’s dilator and wire.
Double Wall Technique

Sheath Insertion
Radial Artery Spasm

**Reasons**
- Vascular Trauma (Access)
- Friction as a result of catheter movement or sheath removal
- Patient Anxiety

**What Happens**
- The vessel grips onto the catheter/sheath
- Difficulty of advancement or removal
- Gives great pain to the patient if the system is forced out

Radial Artery Spasm occurs in 2%-6% of patients
Radial Artery Spasm Prevention

1. Use of Hydrophilic sheath to reduce friction
2. Use of Smaller sheaths and catheters
3. Spasmolotic Cocktail (Nitroglycerin 200-400mcg, Verapamil 2.5-5mg). Consider alternate vasodilators/antispasmodic.
4. Gentle Sedation
5. Additional vasodilators if needed
Catheters

Ikari Left in RCA
Ikari Left in LCA
Ikari Right in RCA
Tig Mod in RCA
Tig Mod in LCA
Radial Hemostasis

Prevention of Radial Artery Occlusion – Patent Hemostasis Evaluation Trial (PROPHET Study)
A Randomized Comparison of Traditional Versus Patency Documented Hemostasis after Transradial Catheterization

Conclusion

Patent hemostasis is successful in significantly lowering the incidence of radial artery occlusion after TRA, without compromising hemostatic efficacy.
Radial Hemostasis

At the conclusion of the procedure, a hemostasis device is recommended for access site management.
Easy Hematoma Classification after Transradial/Ulnar PCI

<table>
<thead>
<tr>
<th>GRADE</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>INCIDENCE</td>
<td>$\leq 5%$</td>
<td>$&lt; 3%$</td>
<td>$&lt; 2%$</td>
<td>$\leq 0.1%$</td>
<td>$&lt; 0.01%$</td>
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<tr>
<td>DEFINITION</td>
<td>Local hematoma, superficial</td>
<td>Hematoma with moderate muscular infiltration</td>
<td>Forearm hematoma and muscular infiltration, below the elbow</td>
<td>Hematoma and muscular infiltration extending above the elbow</td>
<td>Ischemic threat (compartment syndrome)</td>
</tr>
<tr>
<td>TREATMENT</td>
<td>Analgesia Additional bracelet Local ice</td>
<td>Analgesia Additional bracelet Local ice</td>
<td>Analgesia Additional bracelet Local ice Inflated BP cuff</td>
<td>Analgesia Additional bracelet, Local ice Inflated BP cuff</td>
<td>Consider surgery</td>
</tr>
<tr>
<td>NOTES</td>
<td>Inform physician</td>
<td>Inform physician</td>
<td>Inform physician</td>
<td>Inform physician</td>
<td>STAT call to physician</td>
</tr>
<tr>
<td>REMARKS</td>
<td>- Control blood pressure (BP) (importance of pain management) - Consider interruption of any anticoagulation and/or antiplatelet infusion - Follow forearm and arm diameters to evaluate requirement for additional bracelet and/or BP cuff inflation - Additional bracelet(s) can be placed alongside artery anatomy - Ice cubes in a plastic bag or washcloth are placed on the hematoma - Finger $O_2$ saturation can be monitored during inflated blood pressure cuff - To inflate blood pressure cuff, select a pressure of 20 mmHg $-$ systolic pressure and deflate every 15 minutes - After bracelet removal, use &quot;Velpeau bandage&quot; around forearm/arm for a few hours to maintain mild positive pressure</td>
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Disadvantages

- Catheter manipulation needed
- Difficulty with reaching ascending aorta
- Learning Curve, 80-100 cases
- Radiation exposure (RAPTOR trial)
- Tortuosity of radial/subclavian
Peripheral procedures using Radial Approach

- Transradial Subclavian artery intervention
- Carotid Artery Intervention
- Vertebrobasilar Intervention
- Renal Artery Intervention
- Diagnostic Angiography
TAMI

• Tibiopedal Arterial Minimally Invasive Retrograde Revascularization

• Mustapha, et. al.
Micro puncture Access Kit
Angiosomes
Case Study

• 46 yo M with morbid obesity, DM, CKD, PAD with non healing ulcer and gangrene of left great toe.

• Prior angio showed patent vessels to the knee, but below knee occlusion.

• Pedal access obtained using u/s.
Case Study
Case Study
Case Study
Case 2
Case 2
Case 2
FH Deland Experience

- Same day discharge post PCI
- STEMI Radial access
- Elective Radial Cath, PCI
FH Deland Experience

- Approximately 80% of cardiac catheterizations are performed with radial access.
- Majority of STEMI performed from radial approach.
- Over 100 patients with same day discharge after PCI.
- Same day discharge is the standard rather than exception.
Complications

- Recent Study from EuroPCR 2016
- Reduced wrist strength, increased volumetry (swelling), and decreased sensation at fingertips.
- 2 weeks post procedure
- Abnormal findings in 74.9%
- Patients with dysfunction were younger and more likely to have radial artery occlusion.
Thank You
Questions