Step by Step Technique

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Disclosures

• Consultant: Medtronic, Terumo
• Equity: Vasoinnovations Inc.
Oxymetry + Plethysmography

The clamp sensor is applied to the thumb

- No damping of pulse tracing immediately after radial artery compression: 15%
- Damping of pulse tracing: 75%
- Loss of pulse tracing followed by recovery of pulse tracing within 2 minutes: 5%
- Loss of pulse tracing without recovery within 2 minutes: 5%

Radial Approach

Ulnar artery

Palmar arch

Radial artery


www.cardoegypt.com
Collateralization in UE is more than we think
• Extensive interosseous collaterals
• Dynamic recruitable non-visible circuits.

Recruitable circulation
Abnormal Allen’s = ischemia?

RADAR Study

N=203 patients
RADAR Study

N=203 patients

Valgimigli M. et al. JACC 2014
RADAR Study

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RADAR Study

N=203 patients
A

- Normal Allen's Test
- Intermediate Allen's Test
- Abnormal Allen's Test

Capillary Lactate (mmol/L)

P < 0.0001 for the trend over time
P = 0.92 for Allen's test groups

Pre-Cath | Post-Cath | Pre-TR Band Removal | 24 hours | 1 Month | 1 Year

1.50 | 1.75 | 2.00 | 2.25 | 2.50

* *
Ideal Puncture Site

> 10 mm proximal to the “crease” of the wrist
Ideal Puncture Site

> 10 mm proximal to the “crease” of the wrist

Radial Artery Access

• TR vs. TF access
  smaller needle (20” or 16”)
  bare-needle vs. teflon-sheathed needle
  0.018” or 0.021” guidewire
Puncture techniques

• Anterior puncture technique

  similar to femoral access
Anterior puncture technique

Counterpuncture technique
Counterpuncture
Withdraw Teflon cannula parallel to skin
Kinking is prevented by constant pull

Upon entry into lumen from posterior wall, cannula “straightens” out
Upon entry into lumen from posterior wall, cannula “straightens” out.
Anterior puncture / metallic needle users, enter at “shallow” angle
Anterior puncture / metallic needle users, enter at “shallow” angle
RATE trial

<table>
<thead>
<tr>
<th></th>
<th>Group I (Seldinger technique)</th>
<th>Group II (Modified Seldinger technique)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>210</td>
<td>202</td>
<td></td>
</tr>
<tr>
<td>Hematoma (%)</td>
<td>1 (0.5)</td>
<td>3 (1.5)</td>
<td>&gt; 0.2</td>
</tr>
<tr>
<td>Early RAO (%)</td>
<td>17 (8)</td>
<td>16 (7.9)</td>
<td>&gt; 0.5</td>
</tr>
<tr>
<td>Chronic RAO (%)</td>
<td>9 (4.3)</td>
<td>8 (3.9)</td>
<td>&gt; 0.5</td>
</tr>
</tbody>
</table>

Hydrophilic sheath

- Less spasm (Saito et al, Rathore et al),
- Increased comfort
- ? Less entrapment
- ? Less RAO

Radial Cocktail

- Vasodilators (prevent spasm)

Nitrates (200 mcg IA)

Calcium channel blockers
Diltiazem 5 mg, Verapamil 2.5 mg
IA
Anticoagulants

- Prevent radial artery occlusion

- Unfractionated heparin at least 50 U/Kg
  (Spaulding et al, Leipzig study, Bernat et al)

- Systemic effect, IA vs IV
  (Pancholy et al)
Anticoagulation

• Effect probably related to degree of anticoagulation

• Seen with Bivalirudin (Plante et al)

Warfarin anticoagulation

• RAO prevention = UFH
Incidence of Radial Artery Occlusion in Patients Receiving Warfarin Compared to Heparin

Early RAO

- Warfarin: 13.9%
- Heparin: 9.6%

Late RAO

- Warfarin: 18.6%
- Heparin: 5.2%

P = 0.024
P = 0.01

Summary

- Use dedicated access equipment
- Counterpuncture faster, first-attempt success
- Hydrophilic introducer sheath
- Spasmolytic cocktail
- Anticoagulation
Thank you