Trans-radial Access Intervention

Kevin “Chaim” Herman, MD
Interventional Institute Holy Name Medical Center, Teaneck, NJ
Advanced Interventional Radiology Services - Partner

Disclosures

- None.

Goals:

- Choosing an AVF access site
- Patient selection
- Technique
- TR Data
- Cases

Choosing an AVF access site

- Antegrade vein puncture
  - Approach to venous outflow disease
- Retrograde vein puncture
  - Allows clearing of arterial plug
  - Approach to arterial anastomotic and native arterial lesions
- Brachial artery puncture
  - Predominantly diagnostic to identify AV anastamosis
- Radial artery puncture

Limitations of the traditional approach

- Depiction of anastamosis and afferent artery difficult to evaluate during reflux angio
- Two access sites often needed
- Risk of distal embolization
- Fluoroscopic exposure!!
- Risk of puncture site occlusion during compression

Advantages of TR HD angio

- Easy to visualize arterial anastamosis
- No risk of arterial emboli
- Single sheath
- Able to visualize and treat entire access circuit
  - Easy to identify and treat arterial lesions
- 5 minute hemostasis with Tip-Stop™ and manual hemostasis (+/- heparin use or rt-PA)
- Reduced operator fluoroscopic exposure
Patient Selection:

- Palpable radial pulse distal to AVF
- Sufficient caliber for puncture
- Anticipated locations of lesion
- Allen test
- Subsequent need for patent radial artery
- REVIEW prior cases!!!

Allen Test

Slide courtesy of J. Olin DO

1% lidocaine
NO vasodilator
US (I ALWAYS use it)

Micropuncture technique

Initial 0.018” wire

Micropuncture dilators
(Initial angi either through 3- or 5-Fr)
Start with 4-5 Fr sheath for interventions

4 Fr Kumpe catheter over 0.035" wire for UE arteriogram, lesion crossing

Tip-Stop™ hemostasis

Transradial approach

- Japan – Kawarada, et al. CCI 2006
  - n=11 pts, 14 BC fistulas → (12 non-thrombosed)
  - 0.1 mg of isosorbide dinitrate thru sheath; 3,500 IU heparin
  - 5-6 Fr sheaths
  - 100% technical success
  - NO hand ischemia
  - 0% complications out to 6 mths

- Taiwan – Lin, et al. Sem Dialysis 2008
  - n=101, 165 transradial procedures (99 clotted)
  - all upper arm access – 69 AVG, 32 AVF
  - 5 Fr sheaths
  - 3000 IU heparin, no vasodilator
  - 2 cases of radial artery spasm preventing Rx, 2 cases of axillary artery extravasation
  - NO hand ischemia

- Taiwan – Chen, et al. CV Intervent Rad 2009
  - n=131, 154 transradial procedures (99 clotted)
  - ALL Brescia-Cimino fistulas
  - 52 (34%) occluded – “fibrous” occlusions
  - 99% technical success if not occluded
  - only 46% success for fibrotic occlusions – not satisfactory
  - Thirty-day primary patency 75% (overall) → 85% (if patent)
Stenotic BC fistula

Flow preferentially redirected to fistula during sheath injection

RC Fistula

4 Fr Kumpe catheter

5 mm cutting balloon

6 Fr short sheath

FINAL

Aneurysmal stenotic wrist AVF

What access? How to treat?

CLOTTED UPPER ARM AVF

anastomosis
Advance catheter
Inject rt-PA

Balloon and Sweep

After PTA and stent

CLOTTED RC AVF

4 Fr Kumpe catheter for rt-PA injection

7 mm Fox balloon sweep and PTA

Poor cephalic flow
**Technical tips**

- Subcutaneous periradial NTG (500 mcg) facilitates radial puncture – JVIR 2009
- New monorail balloons (BSC-Sterling) allow dilation of CV up to 10 mm via 5 Fr sheath
- Generally, sheath limit is 5-6 Fr (depending upon radial diameter)
- **Non-occlusive hemostasis preserves arterial patency**

---

**Contraindications to TR angio**

- CV lesions requiring large balloons, large sheaths
- Failed Allen test
- Hypoplastic artery
- Radial artery spasm

Major complications (i.e. occlusion) in <3%
Small caliber of radial artery

Central venous lesion requiring larger introducer

S/P PTA needs stent, 7 Fr sheath
### Complications

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Pt</th>
<th>Rx</th>
<th>Complication type</th>
<th>Cx%</th>
<th>Technical Success Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yu-Sheng L</td>
<td>2008</td>
<td>101</td>
<td>165</td>
<td>lesion rupture at central media extravasation and distal</td>
<td>9.70%</td>
<td>N Anatomic: 89.7% Clinical: 84.2%</td>
</tr>
<tr>
<td>Yeong-Ming C</td>
<td>2006</td>
<td>131</td>
<td>131</td>
<td>venous rupture in one (1) case, treated by compression venous rupture at the occluded site w/ subsequent hematoma, venous rupture at distal outflow vein after balloon dilation</td>
<td>4.70%</td>
<td>N Anatomic: 91.1% Clinical: 81.1%</td>
</tr>
<tr>
<td>Chi-Cheng W</td>
<td>2009</td>
<td>48</td>
<td>48</td>
<td>venous rupture in one (1) case, treated by compression venous rupture at the occluded site w/ subsequent hematoma, venous rupture at distal outflow vein after balloon dilation</td>
<td>4%</td>
<td>Y Anatomic and Clinical: 96%</td>
</tr>
<tr>
<td>Chi-Cheng L</td>
<td>2013</td>
<td>73</td>
<td>73</td>
<td>n/a</td>
<td>n/a</td>
<td>N Anatomic and Clinical: 90.2%</td>
</tr>
<tr>
<td>Ung-Rae J</td>
<td>2009</td>
<td>50</td>
<td>7</td>
<td>none</td>
<td>n/a</td>
<td>N PTA successful in 10/11 lesions</td>
</tr>
<tr>
<td>Kawarada O</td>
<td>2006</td>
<td>11</td>
<td>3</td>
<td>none</td>
<td>n/a</td>
<td>N PTA successful in 10/11 lesions</td>
</tr>
</tbody>
</table>

### Conclusion

- Transradial access facilitates complex fistula interventions when possible (Allen’s test) → easy identification of anastomosis
- Allows single puncture in most cases
- Substantially avoids operator exposure
- Complications rare