Radial Artery is an Ideal Acess Site

- Easily accessible even in subjects with severe PVD
- Major advantage in terms of bleeding complications\textsuperscript{1,2}
- Cannulation benefit for most arterial beds
- Improved quality of life\textsuperscript{3}
- Time-sparing hemostasis
- Same-day discharge

2. RIVAL Trial. Lancet 2011
Anthropometric measurements

R Wrist - R Carotid = 65-70 cm
R Wrist - L Carotid (bovine arch) = 65-70 cm

Wrist - Subclavian = 50-65 cm

L Wrist - Renal A = 90 cm
L Wrist - Common Iliac = 110-115 cm
L Wrist - Popliteal A = 160-180 cm
L Wrist - Foot = 200-230 cm

L Wrist - CFA = 125-135 cm
Subclavian Artery Stenting Technique

1. **Access:** 5 Fr short sheath (occasional US guidance)
2. **Diagnostic imaging:** 5Fr MP
2. Exchange for **5-6 Fr 70-90 cm sheath**
3. **Image** either retrograde or antergrade
4. Stable position of the camera – **landmarks**
5. **PTA / Stenting**
6. **Final imaging:** via sheath or pigtail
Subclavian Artery Stenting

**Ideal guide support**

▼ Useless femoral access
Subclavian Artery Stenting

Catheter in the Aorta

Stenting

Useless catheter from the groin ▲
Subclavian Artery Stenting

Advantages of Radial Approach

1. Excellent guide support
2. Prevent excessive guide manipulation in the aortic arch
3. Limited contrast use
4. Absent access-site bleeding complications
5. Immediate ambulation
6. Early discharge
Carotid Artery Stenting

TRA IS the preferred access site for:

1. RICA in the presence of type III aortic arch, or severely disease arch

2. LICA - when it arises from the innominate artery (bovine arch)
Carotid Artery Stenting

RICA in presence of type III aortic arch, or severely diseased aortic arch
LICA in Bovine Arch Technique
Carotid Artery Stenting

TRA IS NOT the preferred access site for:

1. LICA - lack of support and potential for guide prolapse in the aortic arch
Carotid Artery Stenting
Technical considerations

1. Advance the 6Fr Shuttle sheath in the subclavian a.

2. Cannulate the R-CCA (or the L-CCA when arising from the innominate artery) using a 5Fr IM / AR-2 catheter

3. Wire the ECA

4. Telescope SS over the 5fr IM
Carotid Artery Stenting
TRA

• 2-center report:
• CAS - attempted from TR in 382 patients

• Procedural success: 347/382 (91%) patients
  – 201/216 (93%) right CA,
  – 14/16 (88%) bovine left CA
  – 132/150 (88%) left CA.

Etxegoien et al. Cath Cardiovasc Interv 2012
Carotid Artery Stenting
TRA

• Adverse events at 30 days:
  • 2 major strokes (0.6%) / 1 Death
  • 3 minor strokes (1%)
  • No myocardial infarction
  • No bleeding

Etxegoien et al. Cath Cardiovasc Interv 2012
Abdominal vessels
Renal Artery Stenting

- Anatomically, the renal arteries take off in a downward fashion - therefore, cannulation is easier from above.
Renal Artery Stenting

**Technique:** L Radial Access
Either 5 Fr / 90 cm Ansel 1 sheath, or
6 fr guiding catheter MP / AR2 / HS
Renal Artery Stenting

• TRA approach - better than femoral:
  – In general
  – Special circumstances:
    • AAA
    • Severe PVD
    • Steeply angulated renal arteries
Iliac Artery Stenting

- L radial is preferred (gain aprox 5-10 cm)
- IM catheter to direct a 260cm 0.035” wire in the descending aorta
- 5 Fr / 110 cm introducer sheaths
- 5Fr compatible self-expandable stents (Zilver 518 -Cook Medical), or balloon expandable stents
Iliac Artery Stenting

5 Fr 110cm sheath

Post Stenting

330 cm 0.014” Viper wire
Transradial Iliac Stenting

- 80 iliac lesions treated via TRA (28% CTO) or TFA (9% CTO)

Conclusions:
1. Similar contrast use (238 vs 213 ml)
2. Similar fluoroscopy time (30 vs 27 min)
3. Shorter time to discharge (14.4 vs 20.9 hrs)
4. Lower access-site complications (0 vs 7.2%)

Staniloae et al. Cath Cardiovasc interv 2009
CFA Interventions

• No stent zone

• Frequently - atherectomy + PTA

• Most atherectomy devices require 7 Fr introducer sheaths

• DB360 - CSI - the only atherectomy device 5-6 Fr compatible
CFA Interventions

- Left radial access
- Right CFA occlusion
- Left CFA occlusion
CFA Interventions

Shuttle sheath, 6Fr/ 110cm/ 0.087” via left radial access
CFA Interventions

DB 360 - 2.0 SC 30

PTA 6.0 mm balloon
CFA Interventions

Post PTA 6.0 at 4 atm

Residual calcified plaque at the bifurcation
CFA Interventions

Wire in PFA

DB 360 SC

Final result ▼
New Frontiers
SFA / Popliteal

• Currently - severe limitations do to lack of adequate equipment

• Atherectomy with DB 360 - shaft length 145 cm + 15cm

• PTA of the SFA with 170/180mm shaft balloons
TRA is the approach of choice for stenting of the:

1. Subclavian artery
2. Right Carotid Artery – type 3 / diseased arch
3. Left Carotid Artery arising from the innominate a
4. Renal and mesenteric arteries
5. Iliac Arteries
Limitations of TRA for Peripheral Interventions

• Lack of adequate transradial training

• Limited equipment

• Paucity of clinical studies
Equipment Shortage

There is an immediate need for:

1. Larger variety of introducer sheaths (90 / 110 / 125 cm)

2. Longer Guidewires (360-400cm)

3. Stents with shaft length up to 170-180cm

4. CTO / Reentry devices with longer shaft and lower profile
TRANSRADIAL for Vascular Interventions

BASIC EQUIPMENT

Introducer Sheaths: 5 and 6 Fr 90 cm (Terumo); (4-6Fr) 110 cm (Cook)

Wires: 0.014 / 330 Viper (CSI); 0.035 / 300 Supracor (Abbott); 0.035 hydrophilic coating (Terumo; Cordis)

Balloons:
- longest shaft 170/180mm (Cook, Medtronic)

Scoring Balloons:
  Angiosculpt - 5 Fr - up to 6.0 - 137-139cm shaft
  Cutting Ballons - 6 Fr - 137 cm
  Chocolate Balloons: 6 Fr – 140 cm length

Stents:
  the only 5 Fr platform - Zilver stent (Cook) -125cm
  6 Fr platform - longest shaft 135 (Abbott)
TRANSRADIAL
for Vascular Interventions

ADVANCED EQUIPMENT

• **CTO Devices:**
  – CROSSER (Bard) - 146 cm shaft - 6Fr (14S)
  – Wildcat (Avinger) 6Fr - 110 cm; 5Fr - 140 cm
  – Frontrunner (Cordis) - 140 cm
  – TruePath (Boston Sci) – 140cm

• **Reentry Devices:**
  – Outback (Cordis) - 6 Fr - 120 cm
  – Pioneer (Volcano) - 6 Fr - 120cm
  – Enteer (EV3) – 5Fr 135-150cm
  – OffRoad (Boston Sci) 5-6 Fr – 100cm
TRANSRADIAL
for Vascular Interventions

ADVANCED EQUIPMENT

• **Atherectomy:**
  – DB 360 – 160cm reach (145 cm shaft + 15cm though) - all crowns fit in 5 Fr (except 2.0 mm)
  – TurboHawk, JetStream, Laser – large profile

• **IVUS:**
  – Volcano - 150 cm
  – Atlantis (Boston Scientific) - 135 cm