Ultrasound Guided Puncture for Retrograde Access

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Retrograde Tibial/Pedal Access

• Retrograde Tibial access used in 30-40% of BTK interventions in my practice
• Indication:
  – Crossing Lesions when antegrade attempts fail
  – Intentional early retrograde access to avoid extensive antegrade subintimal dissection
  – Complete retrograde access for the whole intervention (TAMI)
Preserving collaterals

Antegrade subintimal approach would destroy collaterals ➔ use early retrograde approach
Ways to perform Retrograde Access

1. Ultrasound Guided (USG)
2. Fluoroscopy
3. Open Technique
Choosing target vessel

1. Angiosome concept/Wound Related Artery?
2. Vessel Size, Quality and Tortousity
3. Location of vessel – avoiding areas around joints
4. Length of unoccluded vessel proximal to puncture site for support
5. Potential sites for bailout bypass
Types of Tibial Access

1. High Tibial
   - Sheathless access, 2.9 Fr pedal sheath
   - or 4 French sheath

2. Tibial/Pedal
   - Sheathless access or 2.9 Fr pedal sheath

0.025” GW

Courtesy Schmidt
Popliteal Block and Sedation

• Popliteal Block + Saphenous nerve block
• Blocking the sciatic nerve at level of popliteal fossa
• Achieves Anaesthesia for 4 hrs of entire distal 2/3 of lower leg and Analgesia for 24 hrs (Marcaine and Lignocaine used)
US GUIDED TIBIAL/PEDAL RETROGRADE ACCESS
Position and Anaesthesia - PT

Ankle Neutral

Ankle Dorsi-Flexed
Freq: 13-6 MHz
Depth: 6 cm
Footplate: Narrow
*Retrograde Pedal Access, Brachial/Radial access, AVF Interventions*

4 cm 21 G Needle
0.018 wire
PT – Transverse and Longitudinal Section

- Artery
- 2 Veins

Assess the quality of puncture site
Generous Skin Incision – Before Puncture
Key points

- Needle at centre of probe
- Needle at the edge of probe
Key points

- Needle at the edge of probe
- Area of interest at centre of screen
Key points

- Full Shaft of Needle and Needle tip is Visualized
- Whole Length of Target Vessel is Visualized
- Angle of approach is 30 - 45 degrees
USG PT access

V18 wire Short Taper
US GUIDED HIGH TIBIAL RETROGRADE ACCESS
High Tibial Access

• Advantages
  – Easy haemostasis, avoids cumbersome P3 approach
  – Can be done supine without bending knee
  – Larger vessel (as compared to pedal)
  – Ability to place 4F up to 6F sheath for tough CTOs ➔ bilateral stiff Terumo wires and angled support catheters
  – Avoids pedal access which could be used for bypass

• Disadvantages
  – Can potentially damage vital ATA runoff
Case eg

Small AVF
Pitfalls

Potential inadvertent wiring of recurrent ATA
SOME TRICKS FOR RETROGRADE ACCESS
Avoid Tortious vessels
Having enough support

2-3 cm of patent artery for support

Straight portion of DP to puncture
Puncturing small arteries – Lateral Plantar US Guided

0.014 wire + dilator only for access
Puncturing a non essential vessel for access

Puncturing the Medial Plantar Artery (more superficial & medial course) to open the Lateral Plantar Artery
Snaring/Rendevous

Popliteal Artery

Within Occluded Tibial vessel
HAEMOSTASIS OF RETROGRADE ACCESS
Haemostasis – High Tibial

1. Direct Compression
2. Blood Pressure Cuff
3. Low Pressure Balloon angioplasty

Shallow artery – Anterior compression is sufficient
Haemostasis – Tibial/pedal

Peroneal and PT are deep seated artery – Anterior compression would be useless ➔ BP cuff or balloon assisted

Anterior compression for ATA
When I would **not** do an USG retrograde

- Peroneal (especially in a fat patent)
- Very swollen legs (plenty of soft tissue fluid worsens imaging)
- Calcium is very clear
Calcification is clear – Fluoro is easier
## USG vs Fluoro

<table>
<thead>
<tr>
<th>Advantage</th>
<th>USG</th>
<th>Fluoro</th>
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<tr>
<td></td>
<td>• Able to assess quality of vessel</td>
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<td></td>
<td>• Real time – especially useful in uncompliant patient</td>
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<td></td>
<td>• Less radiation</td>
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<td>Disadvantage</td>
<td>• Learning curve</td>
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<td></td>
<td>• Need dedicated sterile ultrasound with High Freq Probe</td>
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<tr>
<td></td>
<td>• Difficult over joints eg anterior ankles</td>
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<tr>
<td></td>
<td>• Radiation exposure</td>
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<td>• Tough in uncooperative patient</td>
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Summary

• Contemporary techniques to tackle CTOs require retrograde access
• US guided access is safe, reduces radiation exposure but requires *practice* and *patience*
• Quality of equipment is important
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