Peripheral Arterial Disease: A Practical Approach

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The opinions and clinical experiences in the following presentation are for informational purposes only. The results from this case study may not be predictive for all patients. Individual results may vary depending on a variety of the following patient specific studies.
Anatomy

I like to divide the peripheral vascular system into segments:

- **Aorto-iliac (INFLOW)**
  - Aorta
  - Iliac: Common, External

- **Femoral-Popliteal (“THE PIPE”)**
  - Femoral: Common Femoral, Superficial Femoral, Profunda Femoris
  - Popliteal

- **Tibio-Peroneal (OUTFLOW)**
  - Tibio-peroneal trunk
  - Anterior Tibial, Peroneal, Posterior Tibial
Aorto-Iliac Segment
Femoral-Popliteal Segment
Tibio-Peroneal Segment
Critical Concept

- No vascular segment is in isolation
- With a inflow lesion, more distal treatments will be unsuccessful
- Always treat inflow lesions first (Proximal to Distal)
  - Aorto-iliac
- Outflow vessels critical to long term patency of the peripheral vascular system & perfusion of Vascular Bed
  - Tibio-peroneal
Lesion Characterization

Key Elements:

- **Eccentric vs Concentric Narrowing**
  - Eccentric: Unresponsive to PTA = stenting
  - Concentric: Variable responsiveness to PTA

- **Calcified vs Non-calcified**
  - Calcified: Unresponsive to PTA = stenting
  - Non-calcified: Variable responsiveness to PTA
Key Elements:

- Occlusion vs Narrowing
  
  **Occlusions**
  - Aorto-Iliac: Primary Stenting
  - Femoral-Popliteal: Subintimal PTA +/- primary or secondary stenting
  - Tibio-peroneal: Subintimal PTA/CTO Devices/Alternative PTA technologies (Polarcath, PCB)

  **Narrowing (>75%)**
  - Aorto-Iliac: PTA vs Primary Stenting
  - Femoral-Popliteal: PTA +/- primary or secondary stenting
  - Tibio-peroneal: PTA/Alternative PTA technologies (Polarcath, PCB)
Lesion Characterization

Key Elements

- **Focal vs Diffuse Disease**

  - **Focal**
    - Aorto-Iliac: PTA or Primary/Secondary Stenting
    - Femoral-Popliteal: PTA +/- primary or secondary stenting
    - Tibio-peroneal: PTA/Recanalization Devices/Alternative PTA technologies (Polarcath, PCB)
Lesion Characterization

Key Elements

- Focal vs Diffuse Disease

  Diffuse

  - Aorto-Iliac: Primary Bare Stenting or Covered Stent
  - Femoral-Popliteal: Primary Stenting or Covered Stent
  - Tibio-peroneal: PTA/Recanalization
    Devices/Alternative PTA technologies (Polarcath, PCB)
Intervention Complications

- Thrombosis or Occlusion
  - Length of intervention
- Dissection
  - Meticulous technique
- Rupture
- Access site complications
  - Meticulous technique
PTA Limitations

- “Watermelon seed effect”
- Duration of inflations
- Profile and passage of balloon
ILIAC INTERVENTION
Case History #2

- 63 yo female presents with right leg claudication for 6 months
- Remote history of coronary artery angiogram via right common femoral artery access
Diagnostic Angiogram
Post Stent Placement
Interventional Procedure
Clinical Follow-up

- Patient’s symptoms completely resolved post stent placement.
- There was no further recurrence of symptoms
Case #3 History

63 yo female

3 year history of intermittent claudication involving left buttock and leg

Placement of iliac stent in left common iliac artery 2 years ago

Now presents with 5 month history of rest pain in left leg

Poor operative candidate:

Grade 4 ventricle

Marked obesity
CTA Case #3
Intervention
An 68 year old female patient presented with a 6 month history of progressive bilateral buttock and thigh claudication. She was unable to walk up one flight of stairs without pain. Physical examination demonstrated absence of bilateral femoral pulses.

A diagnostic angiogram revealed a distal aortic occlusion proximal to the bifurcation. There was also occlusion of the right renal artery.
Diagnostic Angiogram#1
Interventional Procedure

There was absence of bilateral femoral pulses at the time of the procedure. Using ultrasound guidance punctures were performed into the common femoral arteries bilaterally. Using a KMP catheter and a hydrophilic wire, cannulation into the true lumen of the aorta was performed from both puncture sites.
Interventional Procedure
Interventional Procedure

Bilateral 6x80 mm Luminexx stents were placed from the distal abdominal aorta into the external iliac arteries bilaterally, followed by bilateral 6x40 mm balloon dilation throughout the length of both stents.
Outcome

Following the procedure, there was complete resolution of the patient's claudication symptoms and no evidence of recurrent symptoms on one year follow-up.
The radiopaque tantalum markers on each end of the stent allowed for precise positioning of the ends of the stents above and below the sites of occlusion.

The long length of the Luminexx stent obviated the need for multiple stents.
Iliac Intervention

How to cross the difficult or occluded iliac lesion?

– Start with a regular .035 3mm J wire & Kumpe Catheter
– Next use a straight .035 Newton wire
– *Last resort use a .035 angled hydrophilic wire*
Iliac Intervention
FEMORAL-POPLITEAL INTERVENTION
Case History #5

67 yo male presents with critical limb ischemia in right leg, after occlusion of femoral-popliteal graft
Diagnostic Angiogram

- Complete occlusion of native right SFA
- Uncooperative patient
Subintimal Angioplasty
Subintimal Angioplasty
Subintimal Angioplasty

- Persistent stenosis at origin of Right SFA
  - Elastic Recoil
Interventional Procedure
Subintimal Angioplasty
Results

- Patient did not have to undergo an amputation
- Marked improvement in tissue circulation
Equipment for Subintimal Angioplasty

- .035 Angled Glide Wire
- Check Flow Switch (BSC)
- 5x40 mm non compliant balloon
- 5 FR Van Andel Tapered Catheter
TIBIO-PERONEAL INTERVENTION
Case #7

- 67 year old male, presents with multiple ulcerations in left foot (1\textsuperscript{st} three digits)
- Extreme pain in calf and foot
- “Classic Critical Ischemia”
Case #7

- Tibio-peroneal cases, are preferably performed through a antegrade ipsilateral approach
- Long sheaths are key to technical success
- Small caliber balloons and wire are important to prevent thrombosis
Case #7
Case #7
Case #7
Case #7

6 week follow-up visit, demonstrated evidence of early healing at sites of ulcerations, with improvement in patient’s refractory pain.
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