

# FEMOROPOPLITEAL INTERVENTIONS



## PHYSICIAN

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### ACCESS SITES

- Contralateral femoral used in 85% of cases.
- Antegrade femoral used in 10% of cases, particularly in patients with severe contralateral common femoral and/or contralateral proximal iliac occlusion.
- Upper-extremity (brachial) access used in approximately 3% of cases.
- Transpopliteal retrograde approach is used in approximately 2% of cases and requires the patient to lie in the prone position during the procedure, therefore limiting patient tolerance.

## DIAGNOSTIC DEVICES USED

### SHEATH SIZES

In most cases we use a short 5-F sheath.

### SELECTIVE DIAGNOSTIC CATHETERS

A 5-F pigtail catheter is used to perform a distal aortogram and iliac arteriography, and to “crossover” the iliac bifurcation; occasionally, a 5-F internal mammary artery catheter is required. After crossing over the iliac bifurcation, a 5-F multipurpose sidehole catheter is then positioned in the common femoral artery and used to perform the lower-extremity angiography; occasionally, a 4-F to 5-F glide multipurpose catheter is required to crossover.

### DIAGNOSTIC GUIDEWIRES

A .035-inch, 14-cm J-tip guidewire is used to advance the pigtail catheter. A .035-inch, 180-cm angled hydrophilic wire is used to crossover the iliac bifurcation and in cases of iliac disease or tortuosity.

### DIAGNOSTIC NOTES

Our “crossover” technique involves slightly withdrawing the pigtail catheter, while simultaneously a .035-inch angled hydrophilic wire is advanced into the contralateral common iliac artery and then positioned at the level of the common femoral artery; the pigtail is then removed. Subsequently, a 4-F or 5-F multipurpose sidehole catheter is advanced over the wire across the iliac horn and into the common femoral artery. This maneuver allows for successful iliac bifurcation “crossover” and diagnostic angiography in more than 90% of cases; occasionally, an internal mammary artery catheter (or similar catheter) is required in place of the pigtail catheter to crossover in cases of severe iliac angulation, common iliac ostial disease, prior aortofemoral bypass surgery, etc.

## INTERVENTIONAL DEVICES USED

### INTERVENTIONAL GUIDEWIRES

- We advance a stiff guidewire over the diagnostic multipurpose catheter, remove the diagnostic catheter, and exchange for an interventional sheath to cross over the iliac bifurcation. The sheath is then positioned at the level of the common femoral artery.
- A .035-inch angled hydrophilic wire is appropriate to cross most femoropopliteal lesions. The distal end of the wire is usually positioned at the level of the distal popliteal artery.
- For more difficult or calcified occlusions or stenoses, a full complement of hydrophilic wires may be necessary.
- Regular stiffness, straight hydrophilic wire (260 cm).
- Stiff, angled or straight hydrophilic wires (260 cm).
- For complex lesions, total or near-total occlusions, a variety of other wires may be used, including:
  - Small-caliber 0.014-inch hydrophobic and hydrophilic wires are sometimes used to cross complex lesions.
  - Hydrophilic 0.018-inch wire: gold tipped glide wire or hydrophilic tipped wire.
- Support catheters are of great value to allow wire exchange, reshaping of the wire tip or simply to minimize wire friction and optimize rotation and manipulation of the wire and permit crossing of complex lesions.

# FEMOROPOPLITEAL INTERVENTIONS

## INTERVENTIONAL SHEATH OR GUIDE CATHETER SELECTION

Most of the time we use a 35-cm, braided, bright tip, crossover sheath. The sheath diameter selection depends on anticipated interventional device selection, as follows:

- A 6-F sheath is appropriate to accommodate most nitinol self-expanding stents and balloons.
- A 7-F sheath may be necessary to accommodate long stents, cutting balloons, medium size (up to 2.3 mm) laser catheters, cryoplasty balloons, and medium size atherectomy devices.
- An 8-F sheath is required in order to use large laser catheters and self-expanding covered stent grafts.

## PTA BALLOONS

The choice of balloon size, length, and compliance depends on lesion characteristics and native vessel size. An important consideration for balloon selection is guidewire and sheath compatibility. For most femoropopliteal lesions, balloons are between 4 mm and 6 mm in diameter and 40 mm to 100 mm in length (longer balloons commonly used). We tend to use low-compliance, high-pressure balloons in stented, noncompliant segments.

## STENTS

- Nitinol self-expanding stents are most commonly used for suboptimal balloon PTA results and flow-limiting dissections.
- Self-expanding covered stent grafts are occasionally used for the treatment of aneurysmal disease or SFA recurrent in-stent restenosis.

## INTERVENTIONAL NOTES

- Diagnostic angled tip catheters and fluoroscopy or IVUS-guided needle re-entry devices are useful in complex chronic total occlusions when a hydrophilic wire is advanced subintimally in the vessel wall to cross the total occlusion ("subintimal technique"), and luminal re-entry is required.
- The combination of angiographic road map and balloon dilatation is helpful to determine stent size and length.
- In general, we prefer to avoid stenting the mid and distal popliteal segments and only consider this alternative for very poor balloon results and/or flow-limiting dissections.
- We routinely use laser catheter ablation for debulking complex long SFA lesions, including total and near total occlusions and for debulking of in-stent restenosis.
- Excisional atherectomy is commonly used to treat common femoral artery disease, ostial SFA and profunda femoris artery stenoses, and in-stent restenosis.
- Special attention is needed to avoid large collateral vessel injury and flow restriction. This is particularly important in chronic total occlusions with large collateral-depend-

ent flow arteries when a subintimal approach and stents are used.

## IMAGING

We perform all of our diagnostic and interventional procedures in a peripheral dedicated catheterization suite with a 15-inch image intensifier, digital subtraction acquisition, and roadmapping capability.

## OTHER EQUIPMENT USED

- Excimer laser atherectomy system for debulking long occlusions, diffuse disease, or in-stent restenosis.
- Excisional atherectomy devices, particularly for the treatment of lesions in areas where stenting is not desirable.
- Cryoplasty balloons for relatively short- and medium-length lesions where stenting is not advised.
- Rheolytic thrombectomy or aspiration thrombectomy for thrombus containing lesions or for the treatment of distal embolization.
- Distal embolic protection devices may be appropriate for lesions with a high embolic potential.
- Covered stents should be available for the management of perforations.

## CONTRAST RECOMMENDATIONS

- We use iso-osmolar contrast for all diagnostic and interventional procedures.
- To minimize the chance of contrast-induced nephropathy, an intravenous sodium bicarbonate infusion and oral N-acetylcysteine is used in all patients with a baseline creatinine  $\geq 1.2$  mg/dL and/or a calculated creatinine clearance of  $\leq 60$  mL/min.
- We use the Assist injection device for all diagnostic and angiographic procedures to adjust volume, rate, and pressure of contrast administration.

## PHARMACEUTICALS

- All patients who undergo interventional procedures are treated with a 600 mg oral bolus of clopidogrel and continued in 75 mg daily for at least 3 months.
- During interventional procedures, we anticoagulate all our patients with intravenous unfractionated heparin or bivalirudin to achieve an activated clotting time (ACT) close to 250 seconds.

## TESTS USED

- Differential blood count, blood chemistry, fasting lipid profile, homocysteine, C-reactive protein, PT, and PTT are measured in all patients prior to diagnostic or interventional procedures.
- During interventional procedures, ACT is monitored every 30 minutes, and additional heparin is administered accordingly. ■