

ACUTE LIMB ISCHEMIA



PHYSICIAN
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ACCESS SITES

Femoral: The contralateral femoral artery is used in >90% of cases. One may consider an ipsilateral antegrade femoral artery approach only if a strong palpable femoral pulse is present. The devices described below are those used in femoral access cases.

DIAGNOSTIC DEVICES USED

SHEATH SIZES

6-F introducer sheath.

FLUSH DIAGNOSTIC CATHETERS

5-F to 6-F pigtail catheter.

SELECTIVE DIAGNOSTIC CATHETERS

A 5-F catheter is used to cannulate the contralateral common iliac artery over the aortic bifurcation (the author prefers the Cobra C2). After the placement of a stiff hydrophilic guidewire (the author prefers the Glidewire) in the contralateral iliac artery, the C2 catheter is exchanged for a 45-cm guiding sheath. The tip of the guiding sheath is positioned in the contralateral common femoral artery.

DIAGNOSTIC GUIDEWIRES

A 300-cm, .035-inch angled stiff hydrophilic wire is used to cannulate the contralateral common iliac artery over a selective catheter (Cobra C2 catheter). The same wire is used to support the positioning of a 45-cm guiding sheath placement in the contralateral common femoral artery. After that, the dilator of the guiding sheath is removed. The same wire may be used to advance across lesions in the superficial femoral artery (SFA). To cross lesions in the infrapopliteal artery, a 300-cm, .014-inch steerable guidewire is used.

DIAGNOSTIC NOTES

- The diagnostic pigtail catheter should be placed at the apex of the left kidney for ideal imaging. Because the right kidney is usually lower than the left kidney, placement of the pigtail catheter at the top of the left kidney facilitates the visualization of bilateral kidneys and their

respective blood supplies.

- In patients with a moderate degree of aortic calcification, avoid cannulating the contralateral common iliac artery with a guidewire via a pigtail catheter. This maneuver creates significant pigtail catheter rotational movement above the aortic bifurcation, which may result in plaque embolization. A selective angled catheter (C2, SIM1, or Bern catheter) allows contralateral common iliac artery cannulation with less disruption of the aortic plaque.
- In patients with a tortuous iliac artery configuration, use of a roadmap function may facilitate the cannulation of the contralateral common iliac artery.
- If the pelvic angiogram reveals relatively disease-free contralateral iliac and common femoral arteries, position the tip of a 45-cm guiding sheath in the proximal SFA. In this fashion, only a small amount of contrast material is necessary to evaluate the SFA and popliteal artery without opacifying the profunda femoral artery.
- Hand injection of diluted contrast with 70% dye mixed with 30% heparinized saline is usually sufficient to visualize the lower-leg arterial circulation.

INTERVENTIONAL DEVICES USED

INTERVENTIONAL GUIDEWIRES

A 300-cm, .014-inch steerable guidewire is recommended for use in infrapopliteal artery interventions.

INTERVENTIONAL SHEATHS OR GUIDE CATHETERS

A 45-cm, 6-F guiding catheter is placed in the contralateral common femoral artery or proximal SFA for diagnostic purpose and interventional procedure.

PTA BALLOONS

For long infrapopliteal artery lesions, an over-the-wire balloon catheter (10 cm in length) is used. The diameters of these long balloon catheters range from 2 mm to 4 mm. For ostial lesions located in the tibial or peroneal artery, one should consider cryoplasty rather than standard balloon angioplasty because of potentially decreased incidence of angioplasty-induced dissection. This may reduce the need for subsequent stent placement in the tibioperoneal segments. Similarly, this author prefers the cryoplasty procedure over standard balloon angioplasty for the popliteal artery lesion due in part to the reduced likelihood of procedure-related dissection.

STENTS

Stenting is generally avoided in the popliteal artery or infrapopliteal segments. For focal SFA lesions, a single nitinol stent is preferred to cover the entire segment of the lesions. The length of a single nitinol stent may range from 6 cm to 10 cm. The most commonly used SFA stent is 5 mm or 6 mm in diameter. Be cognizant of the possibility that deployment of a nitinol stent in the contralateral SFA segment may cause the stent to “jump” forward during the deployment process.

OTHER DEVICES

Catheter-directed atherectomy is useful in femoropopliteal or infrapopliteal lesions less than 15 cm in length. However, be aware of the possibility of procedure-related embolization. One should make efforts to visualize all distal runoff vessels prior to any atherectomy procedure, and compare with a postprocedure angiogram to ensure no vessel embolization occurs. Either catheter-directed atherectomy or cryoplasty is very effective in focal popliteal or tibial artery lesion. For anastomotic stenosis in a lower-leg bypass graft, cutting balloon angioplasty is effective in restoring the flow

lumen. In plaque-laden and thrombosed infrainguinal vessels, excimer laser is effective in restoring the flow lumen by debulking the plaque as well as vaporizing thrombus.

INTERVENTIONAL NOTES

- One must be aware of the guidewire tip at all times during the interventional procedure. Any movement to exchange the guidewire, selective catheter, or balloon catheter must be done diligently to avoid accidental removal of the guidewire.
- One may add a Tuohy-Borst adapter in a 4-F angled Glidecath over a .014-inch guidewire, which permits contrast injection over the 4-F Glidecath to visualize infrapopliteal artery circulation.
- When cannulating a diseased or heavily calcified femoropopliteal artery, a combination of an angled Glidecath and straight stiff hydrophilic wire works well to provide adequate directional control for guidewire advancement.
- To moisten the guidewire, use a wet gauge to moisten it from the distal guidewire tip toward the introducer sheath. This avoids accidental removal of the guidewire from the introducer sheath.

IMAGING

If the interventional procedure is performed using a mobile C-arm, one can utilize the high-level-fluoroscopy mode to perform a lower leg runoff arteriogram, which provides a nonsubtracted image. The best way is to use a power injector connected to the contralateral guiding sheath with an injection rate of 4 mL to 5 mL per second with a total volume of 15 mL to 20 mL. A fluoroscopic operating room table is required in this technique. The operator needs to move the fluoroscopic table to visualize the contrast injection to complete the runoff arteriogram.

CONTRAST

70% contrast, 30% heparinized saline (ie, 1,000 units heparin per liter of saline)

PHARMACEUTICALS

Intravenous bivalirudin for lower-leg arterial interventions (0.75-mg/kg bolus followed by an intravenous infusion at a rate of 1.75 mg/kg per hour for the duration of the intervention) ■