

SFA Intervention

Several successful devices make the treatment of even complex long occlusions of the SFA possible.

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Many patients may experience superficial femoral artery (SFA) occlusive disease. Although many lesions are asymptomatic and do not need to be opened, other lesions may lead to significant claudication. Disease of the SFA may also be part of a multilevel obstructive process that may play a role in the development of critical limb ischemia. Isolated SFA occlusive disease rarely gives rise to critical limb ischemia unless embolization from a friable lesion occurs.



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ACHIEVING VASCULAR ACCESS IN SFA PROCEDURES

Percutaneous access is customarily completed from the retrograde, contralateral femoral location. However, the antegrade femoral or popliteal arteries are sites that may also be commonly used. In special circumstances, brachial artery or axillary artery access may be used. An open-surgical ateri-



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otomy may be indicated when there is significant coexistent common femoral artery disease that requires patch angioplasty.

Sheaths for SFA Procedures

Devices for the SFA are most commonly 6-F based. However, there are multiple devices that will require 7-F and 8-F sheaths as well. Flexible sheaths are recommended for SFA treatment to decrease the risk of kink development that may occur due to the inherent angles associated with the aortic bifurcation and antegrade access. Selected sheath length should be long enough to reach from the contralateral access or short enough for antegrade access.

Advancing sheaths around the aortic bifurcation may be achieved by gently withdrawing the introducer while steadily advancing pressure on the sheath or by using a balloon that is inflated just past the sheath. The sheath is advanced while the deflating balloon is withdrawn back into the sheath. Hydrophilic sheaths are associated with higher success in difficult bifurcations.

Diagnostic Catheters

Multiple types of catheters may be used to help cross the aortic bifurcation. Often, simple pigtail catheters, hook catheters, and internal mammary catheters are adequate. In patients with severe bifurcation angulation or with an aortic bifemoral bypass, newly developed, deflatable-tipped catheters may facilitate wire advancement into the contralateral vascular bed.

Guidewires

When crossing bifurcations, use .035-inch/.038-inch hydrophilic, .035-inch torque, or .018-inch/.013-inch transition wires. When crossing stenoses, use .035-inch/.038-inch hydrophilic, .035-inch torque, .018-inch/.013-inch transition wires, or .018-inch or .014-inch flexible wires. When crossing occlusions, use .035-inch straight and angled hydrophilic, .018-inch hydrophilic, or .035-inch nonhydrophilic guidewires.

INTERVENTIONAL DEVICES

CTO Devices

It would be anticipated that approximately 80% of chronic total occlusions (CTOs) can be traversed with simply a catheter and the previously listed wires. There are currently available dedicated CTO devices that use hollow-angle needles to traverse back into the true lumen. Visual guidance is completed with either marker confirmation or intravascular ultrasound guidance. Another method to cross CTOs employs excimer laser ablation to pass the wire.

Acute Arterial Thrombosis Systems

Acute arterial thrombosis may be treated with endovascular means if the physician possesses the requisite skills and the clinical scenario is acceptable. Treatment may be completed with off-label use of thrombolysis or on-label use of aspiration catheters or mechanical thrombectomy devices. For extensive thrombus, such as that observed in graft thrombosis, rheolytic thrombectomy with or without thrombolysis or vibrating/ultrasonic infusing systems appears to hasten clinical success.

TABLE 1. THE CURRENT STATE OF DEVICE DATA

Device	FDA-Approved Indication for This Vascular Bed	Randomized Trial Data With Superiority to PTA	Multicenter Registry Data in Short Lesions	Multicenter Registry Data in >10-cm Lesions	Randomized Trial Data With Equivalence to Surgical Bypass	Safety in Comparison to PTA	Difficulty in Treating Restenosis	Comments
Balloon-expandable stents	—	•	•	—	—	—	•	Rarely used. Compression is a problem in lower half of the superficial femoral artery
Self-expanding stents (nitinol)	—	•	•	•	—	•	•	Edwards LifeSciences (Irvine, CA) has submitted to FDA*
Drug-eluting stents	—	—	•	—	—	—	•	Zilver PTX trial in US; STRIDES trial in Europe
Excimer laser	•	—	•	•	—	•	—	CELLO trial completed
Stent grafts	•	—	•	•	•	—	•	Heparin bonding recently added
Cryoplasty	•	—	•	—	—	•	—	Long-term TLR appears good in short lesions
Directional atherectomy	•	—	•	—	—	—	—	Calcium cutting planned
Rotational atherectomy	•	—	•	—	—	—	—	Limited by sheath size
Orbital atherectomy	•	—	•	—	—	—	—	Studied primarily in small-diameter vessels
Pathway PV (Pathway Medical Technologies, Redmond, WA)	—	—	•	—	—	—	—	New device, few data
— not completed • exists TLR, total lesion revascularization *On December 7, 2007, Edwards announced the sale of the LifeStent product line to C. R. Bard, Inc.								

Occlusive Disease Treatment Devices

Percutaneous transluminal angioplasty (PTA) is a simple, usually effective treatment for focal SFA disease. However, a recent PTA data review has shown PTA to be associated with unacceptably high restenosis rates in lesions 4 cm to 15 cm long. Until very recently, multicenter, randomized data among different devices were not available. To date, only randomized data comparing balloon angioplasty to nitinol stents and balloon angioplasty to excimer laser atherectomy have been completed. Randomized trial data comparing cry-

oplasty or other atherectomy technologies to balloon angioplasty have yet to be completed. Stent fractures have been identified as an issue but seem to be occurring more rarely in the newer flexible stents. Association of stent fractures with restenosis appears inconsistent among manufacturers.

CONCLUSION

With the availability of very successful CTO devices, the treatment of even complex long occlusions of the SFA is possible. Various techniques and technologies exist for the

treatment of SFA disease each with its upside, drawbacks, and identifiable niches. Although many of these treatments carry a peripheral arterial indication other than nitinol stents (no on-label indication at present), excimer laser, and

stent grafts, no comparative data exist to compare the technologies. Physician operators must try to optimize patient outcomes and push industry to sponsor proper comparison trials. ■

Tips & Tricks

Getting Around the Horn

Several maneuvers to promote successful sheath advancement.

Although it is fairly simple to place a wire and catheter across an aortic bifurcation, in some common circumstances, getting a sheath to cross may be fairly problematic. Aortic bifurcations that are severely angulated, calcified, have undergone previous contralateral common iliac stenting, and patients who have undergone a previous aortobifemoral or aortobi-iliac grafting, can be particularly challenging. As the sheath sizes increase, so do the forces preventing sheath advancement. When dealing with these situations, several maneuvers will promote successful sheath advancement and potentially decrease the risk of complications, such as arterial wall dissection or stent deformation.

DEVICE SELECTION

The sheath should be of a braided, nonkinking design, preferably with a hydrophilic coating to allow for easy tracking. Wire choice is equally as important as that of the sheath, although no one wire will be universally successful. The wire should be chosen with either significant stiffness to allow the sheath to track without prolapsing into the aorta or of medium stiffness to allow for the sheath to be directed away from any stent edge or calcified plaque rim. Sheaths that use .018-inch wire introducers may offer a more optimal tip transition and may be useful when attempts with .035-inch wires and other sheath maneuvers are unsuccessful.

ADVANCING THE SHEATH

The real contralateral sheath tricks, however, involve advancing the sheath itself. We find that if one loosens the dilator sheath connection and provides steady forward pressure on the sheath while withdrawing some of the dilator, the sheath will usually advance. This maneuver can be repeated to "walk the sheath around" the bifurcation and down into the external iliac artery. Another trick that can be used only for 6-F and 7-F sheaths employs a recently available shaped dilator, which allows for a long transition zone that prevents having an unprotected sheath edge as the sheath is advanced.

Another (although more costly) highly successful maneuver is to advance the sheath over a deflating angio-

plasty balloon. Once the sheath has been advanced as far as possible, the dilator is removed and a balloon, smaller in diameter than the vessel lumen, is advanced out the end of the sheath. The balloon is positioned so that approximately half is placed past the distal end of the sheath. The balloon is then inflated to approximately 2 atm to 4 atm. This dilation will expand the amount of balloon out of the sheath without damaging the sheath tip. As the balloon is deflated, steady forward pressure is put on the sheath while the balloon is withdrawn. The balloon should protect the sheath tip during any advancement. This maneuver should still be done very slowly while observing the end of the sheath to avoid catching on the vessel wall or, if a stent is present, not deforming a previously placed stent.

CONCLUSION

Proper technique for sheath placement is fundamental to contralateral endovascular procedures. With these few tricks, contralateral vascular access can be successfully achieved. ■

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