

CHRONIC TOTAL OCCLUSIONS



PHYSICIAN
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OVERVIEW

Gaining access through chronic total occlusions (CTOs) has become a very popular subject in the literature regarding peripheral arterial disease. Fortunately, the choices for the operator, and especially for the patient, are expanding thanks to technology that has been applied from cardiac intervention. Still, there are multiple unique factors that continue to plague peripheral vascular outcomes such as slow flow, high restenosis rates, obscure motion, and stress features of the femoropopliteal system. These all make recanalization of CTOs and the particular equipment choices quite difficult.

AORTOILIAC ARTERIES

ACCESS SITES

- We will gain arterial access in both common femoral arteries with a 5-F to 6-F sheath. If the pulses are poor in the diseased iliac limb, we frequently use ultrasound assistance or roadmap from a superior injection.

EXCLUSION CRITERIA

Occluded common iliac arteries are a fairly common occurrence and are quite amenable for recanalization. If the lesion extends into the common femoral artery, however, we are reluctant to recanalize these patients. A major rule to remember is not to burn any bridges for potential surgery later for the patient.

WIRES AND CATHETERS

We will initially try recanalization of CTOs of the iliac artery from a retrograde approach. Our first line of therapy has been a regular .035-inch guidewire, either angled or straight. We will use a short (40 or 65 cm) 5-F diagnostic catheter for support or a mild hockey-tip shape. Our next choice will be a stiff .035-inch hydrophilic wire. The short length of approximately 145 cm to 180 cm gives better torque compared to the longer 260-cm versions. If we are not successful, and a dissection plane occurs that prohibits further advancement of the wire and access into the proximal aorta, we will stop. High risk can occur with long dissection planes in the distal abdominal aorta. Similarly, wire perforations of the iliac artery need to be

monitored, especially if the exit wound is near good flow in the iliac artery. Never advance the diagnostic catheter through such a hole. These complications fortunately are rare, and we are frequently successful in gaining access. Once across, we will advance our catheter and exchange wire for a support-type .035-inch guidewire. Predilatation and stent placement are then required.

A second approach is from the contralateral femoral. We will use an angled catheter and park the catheter tip in the occluded iliac artery. It helps if there is a nubbin or small projection of where the lumen of the vessel is. It is very difficult if the common iliac artery is flush with the aorta.

One of the drawbacks of this contralateral approach is the limited catheter support that the diagnostic catheter provides for long occlusions. Hence, if there is enough room, you can place a 6-F to 8-F angled sheath at the iliac origin for more support. Once the guidewire is across the occlusion and into the femoral system, we will exchange the angled catheter for a Glide catheter, advance this through the total occlusion, and then replace the guidewire for a stronger .035-inch wire.

INTERVENTION

Predilatation with a small balloon (ie, 4 X 4 PTA may be required). We will then stent the lesion. Generally, we will use the self-expandable nitinol stents within the distal common and external iliac artery for the longer lengths available. We will especially use these near the joint spaces. We will use balloon-mounted stents near the origins of the common iliac arteries, especially for kissing stent technique. If the plaque burden is extensive, we prefer to use balloon-mounted stents.

ALTERNATIVE TECHNIQUES

- Laser therapy has had success in gaining access through chronic total occlusions.
- Safe-Cross is an interesting device that shows the wire tip in relation to the vessel wall combined with radiofrequency ablation. We have had limited use of this device to comment further.
- Thrombolytic therapy was quite effective in softening up plaque, which then allows access later. One of the benefits of the treatment is the shortened lesion length requiring less stent length. Distal embolization combined with the difficulty of obtaining urokinase and unit beds has made this technique unpopular.

FEMOROPOPLITEAL ARTERIES

ACCESS SITES

- We prefer to gain an antegrade access in the common femoral artery as long as we have several centimeters in the superficial femoral artery prior to the occlusion. We can then use a 5-F to 6-F sheath depending upon the planned intervention. If the patient is morbidly obese, we will come from the other side. If we come from the contralateral side, we use a Cook Ansel sheath and park it in the common femoral artery.

EXCLUSION CRITERIA

There is much interest in recanalization of CTOs of the superficial femoral arteries and popliteal arteries. Again, remember to do no harm especially to the deep or profunda femoral artery as well as to the joint space.

GUIDEWIRES AND CATHETERS

Once access is achieved, again, our first line of therapy has been a regular .035-inch hydrophilic wire either angled or straight. We will use a 4-F diagnostic catheter or a Glide catheter for support with a mild hockey-tip shape. Our next choice is a stiff .035-inch hydrophilic wire. We prefer the shorter 140-cm to 180-cm lengths, but if we are coming from the contralateral side, then we will use the longer 260-cm lengths. We prefer to stay within the lumen, but if we should become subintimal, then we will gain access back into the lumen. Recent devices such as the Outback re-entry system and Pioneer with Volcano ultrasound assistance are proving very helpful in gaining access back into the true lumen. There are new .014-inch wires that, combined with a 2.5-F catheter, provide another alternative for gaining access through complete occlusions.

Once across, we will switch for a metal braided wire, either a .014-inch or .035-inch wire depending upon the intervention. There is currently much debate on the

intervention techniques once the total occlusion is crossed. Available options include:

- Angioplasty
- Cutting balloon
- Self-expandable stents (metallic for now, maybe biodegradable in the future)
- Cryoplasty
- Atherectomy (not advised for subintimal angioplasty cases)

ALTERNATIVE TECHNIQUES

Alternative techniques for recanalization of chronic total occlusions of the superficial femoral arteries and popliteal arteries include the following:

- Laser therapy has had success in gaining access through chronic total occlusions.
- Intraluminal (location): The radiofrequency aspects of the device have been helpful in gaining access in these total occlusions.
- Thrombolytic therapy was quite effective in softening up plaque, which then allows access later. One of the benefits of the treatment is the shortened length of the lesion requiring less stent length. Distal embolization combined with the difficulty of obtaining urokinase and unit beds has made this technique unpopular. ■