Retrograde Popliteal Artery Access for Angioplasty of Chronic Total Occlusion of the Iliofemoral Artery

Ramachandra Barik, MD, DNB; Debasish Das, DM; Smarak Ranjan Rout, MD; D. Sitharam, CVT; Manas Ranjan Barik, CVT
All India Institute of Medical Sciences Bhubaneswar, Odisha, India

Abstract: Percutaneous angioplasty of a very long-segment chronic total occlusion of the iliofemoral artery is challenging when it is associated with contralateral iliac artery occlusion. In this case report of peripheral angioplasty, we have tried to simplify the procedure by using a systematic approach. We report a case of peripheral angioplasty in which the patient had chronic total occlusion of the right femoropopliteal with total occlusion of contralateral side of the common femoral artery. The revascularization procedure was successfully completed using the ipsilateral retrograde transpopliteal approach.

Key words: chronic total occlusion, toe amputation, retrograde popliteal access, superficial femoral artery, angioplasty

CASE REPORT

A 58-year-old man presented with right lower-extremity claudication at rest with Rutherford grade 4 ischemic atrophy of the right foot despite several attempts at debridement, as well as amputation of some of the toes are often part of the patient history.1 The preferable treatment approach is surgery, but an alternative approach is endovascular intervention using ipsilateral brachial or retrograde popliteal access when the iliofemoral artery is chronically occluded along with significant disease in the contralateral iliofemoral artery. We report a case of peripheral angioplasty in which the patient had CTO of the right femoropopliteal occlusion with contralateral side total occlusion of common femoral artery. The revascularization procedure was successfully completed using the ipsilateral retrograde right transpopliteal approach.

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sheath was introduced into the distal SFA via the popliteal artery. The opening pressure waveform was 60 mm Hg. As this patient was already taking clopidogrel, cilastazole, and a statin, a bolus of 5000 IU unfractionated heparin was given.

The entire length of the lesion was crossed retrogradely with the support of the Optitorque diagnostic catheter (Terumo) and exchange-length wire (Terumo). The patient’s abdominal aortic pressure was 148/84 mm Hg. The iliofemoral area was dilated with a 5 × 80 mm Armada balloon (Abbott Vascular). The distal SFA systolic pressure improved to 92 mm Hg because of flow-limiting dissection in the iliofemoral area and mild dissection in the distal SFA area (Figure 2). The SFA was almost normal in its middle two-thirds. The ugly dissection in its proximal part was stented using a 7 × 80 mm self-expanding stent (Abbott Vascular) with a very good angiographic result.

However, the systolic pressure did not show significant improvement when the popliteal artery sheath pressure was checked. The blood flow via the side arm of the sheath was very slow. Thrombus was suspected, and we avoided flushing the sheath to prevent possible embolization of the thrombus. The popliteal sheath was exchanged using another 6 Fr sheath, and the removed sheath showed clots when flushed (Figure 3). The patient was given an additional dose of 5000 IU unfractionated heparin, and the popliteal sheath pressure became the same as the abdominal aortic pressure. We left mild distal dissection of the SFA to heal naturally, and there was no further claudication at the follow-up.

Figure 1. (A) Computed tomography shows complete occlusion of right iliofemoral artery and almost the entire length of the SFA except at its distal-most part and complete occlusion of left common iliac artery and femoral artery. (B) Ultrasound-guided popliteal artery access (Terumo guidewire) and popliteal vein access (18 gauge Cook needle with short guidewire) while the patient is in a prone position.

Figure 2. (A) Iodinated contrast injection into the popliteal vein to provide a roadmap for arterial puncture. (B) Popliteal artery access. (C) Distal SFA pressure is about 63 mm Hg. (D) Angiogram following the balloon dilatation resulted in significant dissection of the iliofemoral artery. (E) Angiogram following the balloon dilatation showed an almost normal middle two-thirds of the SFA. (F) Distal SFA shows mild dissection after balloon dilatation. (G) Stenting of proximal dissection only. (H) The systolic pressure recorded from the popliteal sheath was about 90 mm Hg because of blood clots in the sheath.
the next month. Triphasic flow was seen on a follow-up arterial Doppler test.

DISCUSSION
The percutaneous approach to revascularize a chronic iliofemoral occlusion poses unique challenges. The type C or D lesion is difficult to handle by contralateral approach because of insufficient support to guide the catheter, balloon, and guidewire as a result of a lack of coaxial alignment. Although the left brachial approach is a reasonable alternative, the relatively long pathway, as well as the potential for stroke and spasm of the brachial artery and antecubital fossa hematoma, are obstacles. The ipsilateral antegrade was not feasible in our case as a result of the diseased left common femoral artery. Therefore, the ipsilateral retrograde transpopliteal was the preferable approach in our case.2,3

The transpopliteal approach is also useful when antegrade recanalization has failed, in addition to cases with common femoral artery stenosis or occlusion, proximal lesions of the SFA with no stump, severe obesity, tandem iliac, and SFA lesions.2,4 As this technique is associated with several complications such as dissections, vessel ruptures, arteriovenous fistulas, pseudoaneurysm, and hematoma, some precautions are extremely important. The surface anatomy of the popliteal artery (A), popliteal nerve (V), and tibial nerve (N) are in AVN relationship with each other from the midline of the body to the lateral condyle of the femur in the popliteal fossa. The leg should be supported to keep it relaxed to avoid contraction of the thigh muscles, which would obliterate the access site. Ultrasound and digital subtraction angiography may be used for roadmapping during puncture. The prone position causes discomfort to patients who are obese or have a sore foot, so the short procedural time with this approach is more comfortable for the patient while also limiting the radiation exposure of the operators. Unless there is significant thrombus burden, as in our case, a bolus of 5000 IU unfractionated heparin is reasonable. Minor dissection that does not limit flow should allow healing on its own; otherwise, the greater number of stents would invite poor long-term outcomes.5

CONCLUSION
The retrograde popliteal artery approach under periprocedural arterial Doppler guidance can be considered safe and effective in cases of chronic and very long-segment iliofemoral occlusions when they are associated with contralateral iliac artery occlusion. ■

Disclosure: The authors have completed and returned the ICMJE Form for Disclosure of Potential Conflicts of Interest and report no conflicts of interest regarding the content therein.

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Address for correspondence: Ramachandra Barik, MD, DNB; Associate Professor and Head of Department, Department of Cardiology; India Institute of Medical Sciences, Bhubaneswar, Odisha, India. Email: cardioramachandra@gmail.com

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