Revascularization of Occluded Axillo-Femoral Bypass Graft by Transpedal and Transradial Approaches in Acute Limb Ischemia

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Percutaneous therapies for peripheral arterial disease (PAD) are continually evolving with advances in technology and experience. In the current era, endovascular therapy has been shown to be non-inferior to surgery in respect to amputation-free survival.[1] Furthermore, it is a significantly less invasive procedure with less morbidity and equivalent quality of life outcomes.[2] We present a case of critical limb ischemia due to an occluded axillo-femoral bypass graft that was successfully revascularized percutaneously via dual access antegrade and retrograde approaches.

Case Report

A 54-year-old patient with severe PAD, type 2 diabetes, and over thirty pack-year history of smoking presented to the emergency department for evaluation of worsening right leg pain. A computed tomography (CT) angiogram of the chest and abdomen was performed to assess for any targets amenable to revascularization. This revealed a thrombotic complete occlusion in the axillo-femoral bypass, as well as occlusion of the right femoral artery distal to the axillo-femoral bypass anastamosis. The distal aorta and bilateral iliac arteries were chronically occluded. Distal runoff was poorly visualized by CT and the patient had a non-healing ulcer on the right great toe. Due to acutely worsening symptoms, the patient underwent attempted peripheral intervention via the right transpedal approach.

The right dorsalis pedis artery was accessed using ultrasound guidance and a 6 French (Fr) system was used. An .035-inch Quick-Cross catheter (Philips) was advanced from the transpedal access into the superficial femoral artery (SFA) for selective angiography, revealing the subtotal occlusion at the level of the femoral and popliteal arteries (Figure 1). The .035-inch wire and catheter were able to advance through the occlusion and into the axillary bypass graft. However, no equipment had the appropriate length to extend further into the axilla. The decision was made to proceed with transradial access to allow for both antegrade and retrograde approaches to revascularization. An .035-inch guidewire was positioned in the axillary bypass as a marker for locating the graft from the arm.

The radial artery was accessed using palpation and another 6 Fr sheath was placed. Selective angiography of the subclavian was obtained, which showed flush occlusion of the axillary bypass graft (Figure 2). A left internal mammary artery (LIMA) catheter was used via the transradial approach and an .014-inch wire was successful in crossing the ostial occlusion of the graft with the pedal guidewire as a marker. Through transradial access, 6.0 mm balloon angioplasty was performed successfully of the entire length of the bypass graft and a Supera self-expanding stent (Abbott Vascular) was deployed with excellent results (Figures 3-4). For more precise

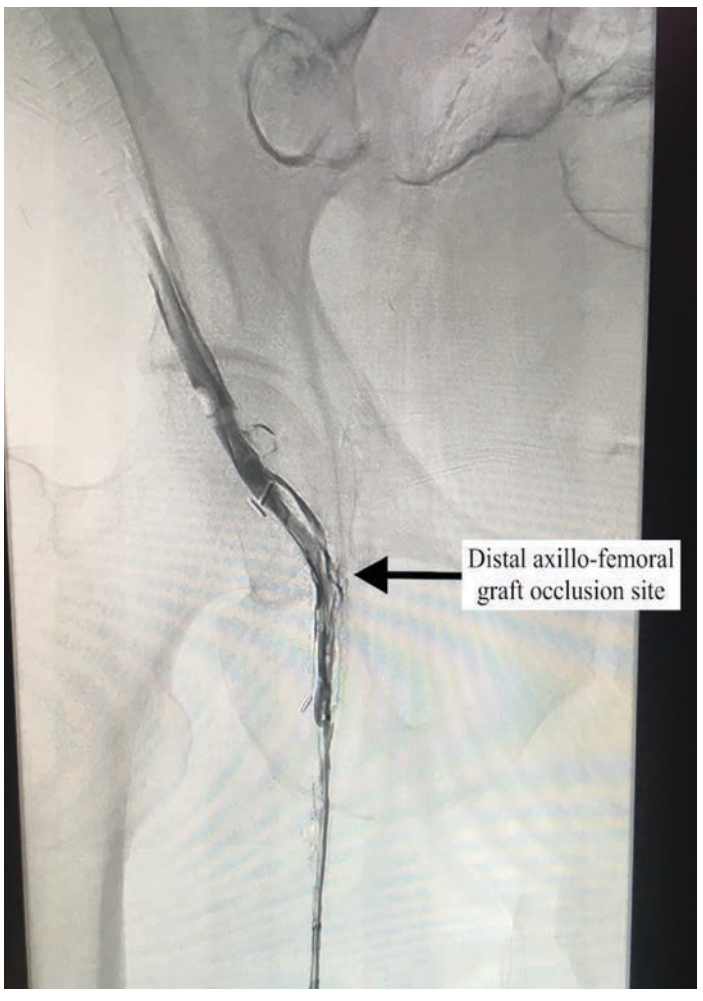

Figure 1. Subtotal occlusion at the level of the femoral and popliteal arteries.

Figure 2. Flush occlusion of the axillary bypass graft.

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Disclosures: Hamza Malik, MS, OMS-1, and Mark Chou, DO, report no conflicts of interest regarding the content herein. Farhan Ali, MD, reports he is a proctor for the PFO Occluder with Abbott Vascular, which makes Supera stents.

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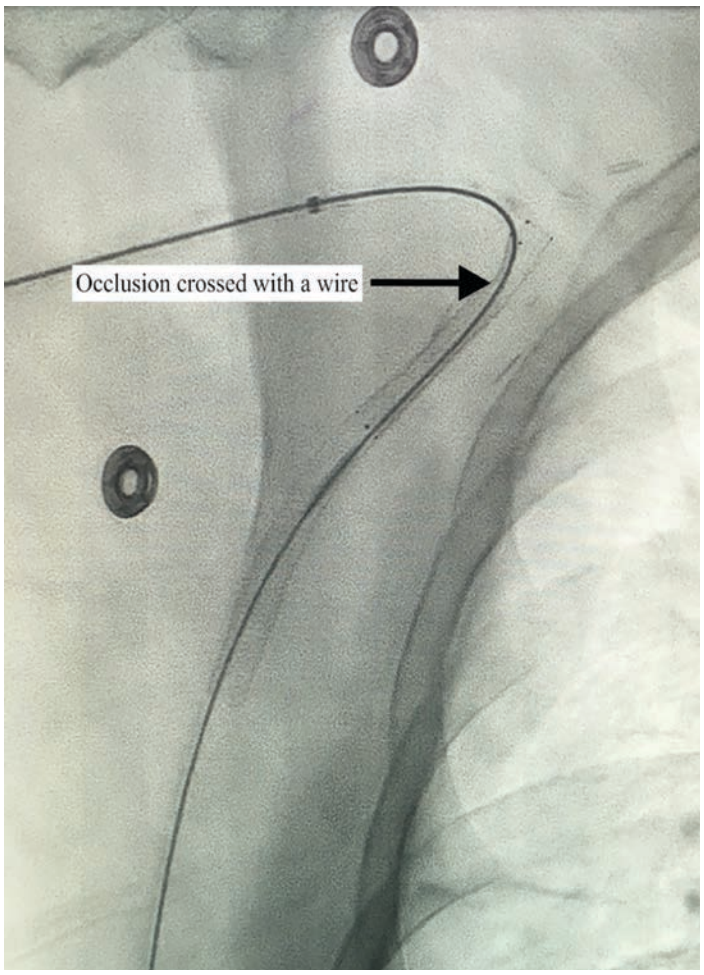

Figure 3. An .014-inch wire was successful in crossing the ostial occlusion of the graft with the pedal guidewire as a marker.

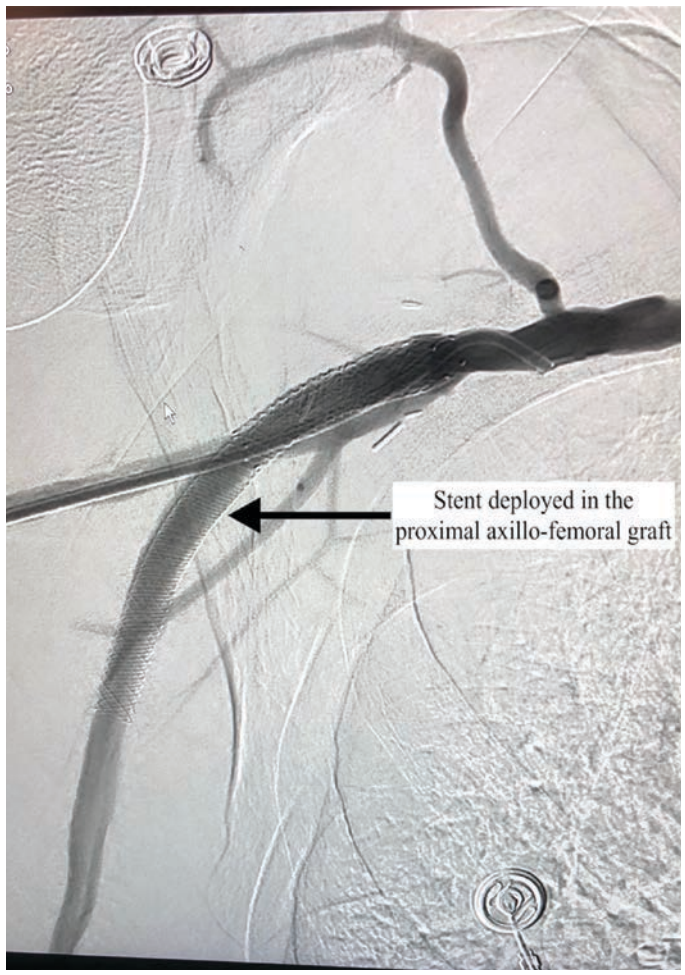

Figure 4. Supera self-expanding stent (Abbott Vascular).

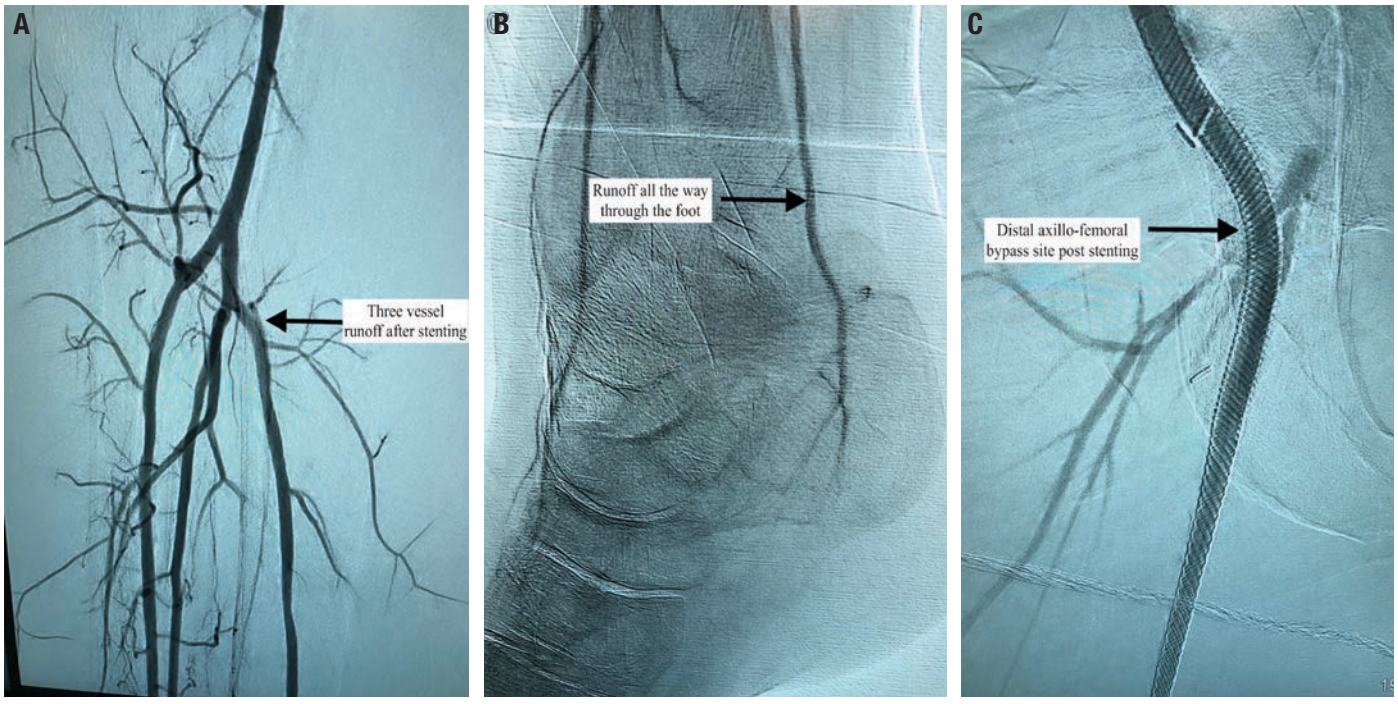

Figure 5A-C. Post tPA infusion, administered overnight via transradial access.

Axillo-femoral bypasses are an alternate form of revascularization in individuals with a totally occluded abdominal aorta. They are less invasive alternatives to aorto-femoral bypass, with reported primary patency rates of 72% and 58% at 1 and 5 years, respectively.[3]

deployment, a self-expanding Innova stent (Boston Scientific) was deployed in the ostial part of the graft (Figures 3-4). The right SFA was treated via transpedal access with a combination of atherectomy, mechanical thrombectomy, and stenting. Finally, a tPA infusion was administered overnight through the transradial access (with the tip of the infusion catheter placed in the proximal axillary graft) (angiographic results, Figures 5-7). To complete this complex procedure, <1 gray (Gy) of radiation was required, significantly less than a level that would cause concern for acute radiation side effects.

Discussion

Axillo-femoral bypasses are an alternate form of revascularization in individuals with a totally occluded abdominal aorta. They are less invasive alternatives to aorto-femoral bypass, with reported primary patency rates of 72% and 58% at 1 and 5 years, respectively.[3] To our knowledge, this case demonstrates the first successful axillo-femoral revascularization via stenting and use of both transradial and transpedal access methods. Previous studies, including one by May et al, demonstrated that an endovascular-first approach to limb salvage can have adequate results, with amputation-free survival of approximately 75.5% and 57.6% at 1 and 2 years, respectively.[4] The BASIL trial is frequently cited as a landmark study that compared surgical bypass with an endovascular approach. Results showed that after 6 months, the amputation-free survival was not significantly different between the two methodologies and that the surgery-first strategy was associated with a significantly higher cost.[1] This case is an excellent example of the expanding abilities and success of endovascular treatments as techniques and operator experience continue to improve. ■

References

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