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Imaging and Case Report

Percutaneous Axillary Artery Access for Lithoplasty of a Heavily Calcified Iliac Artery Chronic Total Occlusion

Hady Lichaa, MD *

Department of Cardiology, Ascension Saint Thomas Heart, Ascension Saint Thomas Rutherford Hospital, Murfreesboro, Tennessee

The increased experience in safe percutaneous axillary access and closure may lead to a slow replacement of the brachial artery site as an alternative access for complex aortoiliac interventions.

Case report

A 54-year-old morbidly obese woman presented with right lower extremity critical limb ischemia symptoms. Pertinent medical history included severe weeping fungal cellulitis of both groins (Fig.1A) and chronic renal insufficiency. Computed tomography angiography revealed bilateral common iliac artery heavily calcified occlusions (Fig. 1B). Surgical bypass was deemed to be too risky because of severe comorbidities.

Both hostile groins were not accessible, and pedal arteries were too small; however, the intervention could not be performed from a left radial approach because of the need for at least the 7F system and the short shaft length of the intravascular lithotripsy (IVL) balloon (110 cm).

The left radial artery was atretic. A left ulnar 6/7F access was required, though, for an angiography and ultrasound-guided percutaneous micropuncture access of the left axillary artery (Fig. 1C). The access was preclosed before the placement of a 70-cm 8F sheath. To minimize the risk of contrast-induced nephropathy, carbon dioxide (CO_2) roadmap aortography was performed through the CO2mmander device (AngioAdvancements) at 25 mL/1.5 s (Fig. 1D).

Crossing of the heavily calcified iliac chronic total occlusion required intravascular ultrasound-guided re-entry (Fig.1E, F–Video 1). This was then treated with a 7 × 60 mm IVL balloon, followed by the placement of an 8 × 80 mm self-expanding stent in the right external iliac artery, a 7 × 37 mm noncovered balloon-expandable stent across the takeoff of the internal iliac artery, and two 7 × 26 mm overlapping covered balloon-expandable stents in the right common iliac artery (Fig.1G–Video 2).

A 7 mm occlusion balloon was parked in the left subclavian artery from the ipsilateral ulnar access for an attempted percutaneous dry closure of the left axillary access, which was unsuccessful despite a second Perclose (Fig. 1H). After failed prolonged angioplasty, a 7 × 50 mm covered self-expanding stent led to successful hemostasis (Fig. 1I).

The leg ulcers healed 2 months after arterial revascularization.

Discussion

Percutaneous axillary access has been shown to be a reasonable alternative to brachial access for endovascular therapy of complex aortoiliac disease[1] given the high complication rate of the latter[2] and the better anatomical suitability for percutaneous axillary closure and bailout stenting.[3,4]

A shallow angle of axillary needle entry is key[5]; however, a longer than 7 cm micropuncture needle was not available here. Therefore, to reach the deep artery under a 5.5-cm pannus, the angle of entry had to be larger, possibly contributing to the lack of adequate hemostasis even after 2 closure devices. In morbidly obese patients, one may have to consider using longer micropuncture needles or a cutdown.

This case also outlines the importance of contrast saving techniques, including the complementation of intravascular ultrasound with CO_2 angiography. Connecting the sheath to a pressured saline flush line after CO_2 injection minimizes thrombosis risk.

Finally, this case also raises the clinical need for longer IVL shaft lengths.

Declaration of competing interest

H.L. is a consultant for the following companies: Philips, Abbott Vascular, Becton Dickenson and Company, Cordis, and Medicure. None

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* Corresponding author.
E-mail address: Hady.lichaa@gmail.com.

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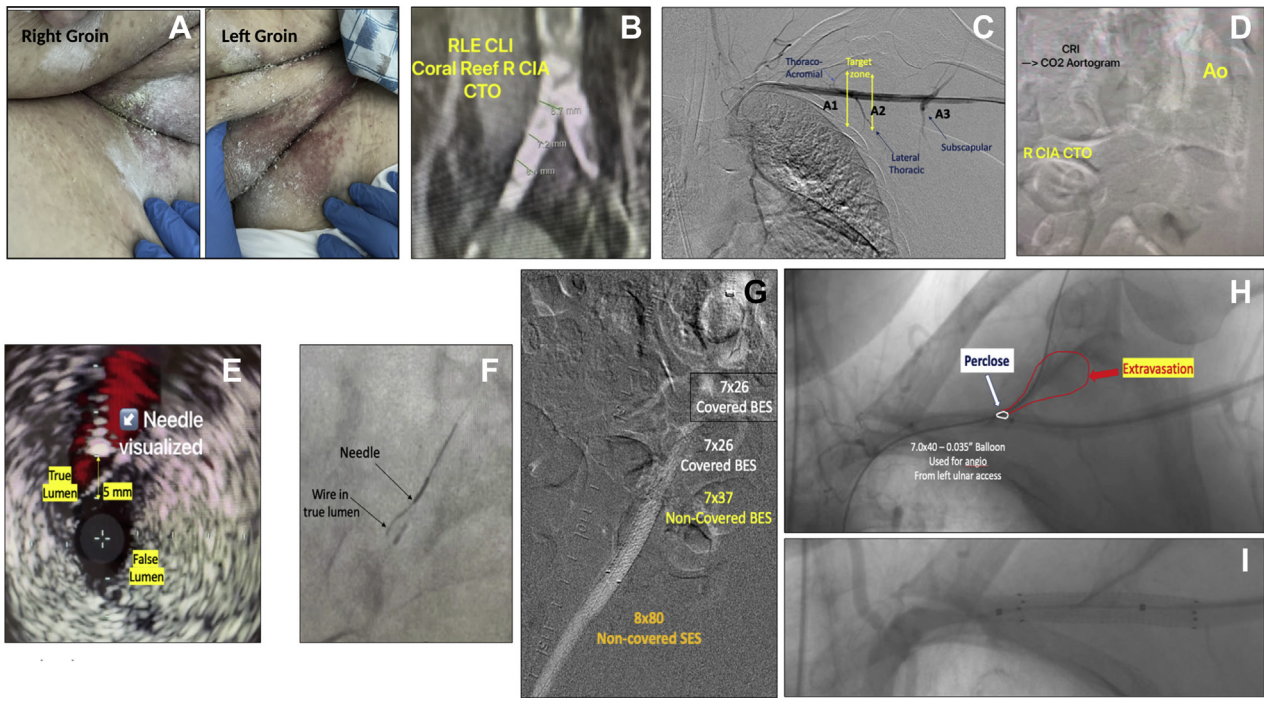

Figure 1. (**A**) Hostile groins: Bilateral severe fungal cellulitis treated with nystatin powder. (**B**) CT angiography of the abdominal aorta with runoff: Focus on the heavily calcified occlusion of the right common iliac artery. (**C**) Percutaneous left axillary artery access: Angiography performed from a left ulnar artery access to guide percutaneous left axillary artery access. (**D**) Aortogram with CO_2 gas: Flush occluded bilateral CIA. (**E**) The IVUS image showing precise needle re-entry. (**F**) The fluoroscopic image of the needle and 0.014″ wire entering the true lumen in the external iliac artery. (**G**) CO_2 iliac arteriogram: Reconstruction of the iliac CTO with different stent types in the different segments of right CIA and external iliac artery. (**H**) Axillary arteriogram after first attempted percutaneous closure: Persistent extravasation after cinching the nonlocking suture of the Perclose ProGlide device (Abbott Vascular). (**I**) Axillary artery covered SES: The extravasation of contrast completely resolved after deployment and after dilation of a 7 × 50 mm Viabahn stent (Gore Medical). Ao, aorta; BES, balloon-expandable stent; CIA, common iliac artery; CLI, critical limb ischemia; CRI, chronic renal insufficiency; CT, computed tomography; CTO, chronic total occlusion; IVUS, intravascular ultrasound; SES, self-expanding stent.

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Ethics statement

The author has adhered with the ethical and research guidelines of the institution.

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