

CASE REPORTS IN INTERVENTIONAL CARDIOLOGY

Novel Distal Left Radial Artery Access in Anatomical Snuffbox for Recanalization of Proximal Radial Artery Total Occlusion and Percutaneous Coronary Intervention Through Left Internal Mammary Artery

Transradial artery (TRA) is considered a gold standard technique for the percutaneous coronary intervention (PCI) because of significantly reduced risk of access-related complications.^{1,2} This is particularly pertinent to the patients with peripheral vascular disease. The distal radial artery (dRA) access in the anatomic snuffbox is a relatively novel technique and is considered useful when left TRA access is required because this allows natural working position for the operator. This case report highlights the additional benefit of using the dRA approach to recanalize the occluded radial artery (RA) in the wrist and then safely proceeding to PCI in a patient with severe peripheral vascular disease.

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CASE REPORT

A 75-year-old gentleman with medical history of coronary artery bypass in 1996, previous multiple PCI to his vein grafts, severe peripheral vascular disease, endovascular repair of abdominal aortic aneurysm, type 2 diabetes mellitus, hypertension, chronic kidney disease, and chronic normocytic anemia was admitted with acute coronary syndrome. The coronary angiogram through the left TRA showed chronic total occlusion (CTO) of all the native coronary arteries. The vein graft to the posterior descending artery and first diagonal branch were patent. The vein graft to left circumflex and ramus intermedius were occluded. The left internal mammary artery (LIMA) to the left anterior descending (LAD) artery was patent. However, a significant stenosis at the insertion point of LIMA to LAD was noted. He was managed medically for 3 months, but because of frequent angina, despite optimal medical therapy, he was admitted for a planned PCI to the insertion point of LIMA to LAD.

He had no palpable left radial pulse at the wrist and had weak femoral pulses. The left dRA (dLRA) was palpable in the anatomic snuffbox (radial fossa, fovea radialis) on the dorsal side of the left hand because of retrograde filling via collaterals from the ulnar artery. So dLRA in the anatomic snuffbox was punctured using radial puncture needle after infiltration of 3 mL 2% lidocaine. A 0.021-inch guidewire could only be advanced up to the wrist level so the access was secured with 4F Cook Micropuncture Catheter. Contrast injection under fluoroscopy showed occluded left RA at the level of the wrist in the forearm (Figure 1A). A Fielder XT-R 0.014-inch CTO angioplasty guidewire was used to cross the occluded segment of RA, and the wire was tracked up into the arm at the anatomic level of the brachial artery. The micropuncture catheter was replaced with Finewire coronary microguide catheter over the guidewire up to the level of the brachial artery. We took the guidewire out and confirmed the position of the microcatheter in the true arterial lumen with contrast injection. Then we inserted our workhorse hydrophilic tip angioplasty guidewire and removed microcatheter, while leaving the wire in place

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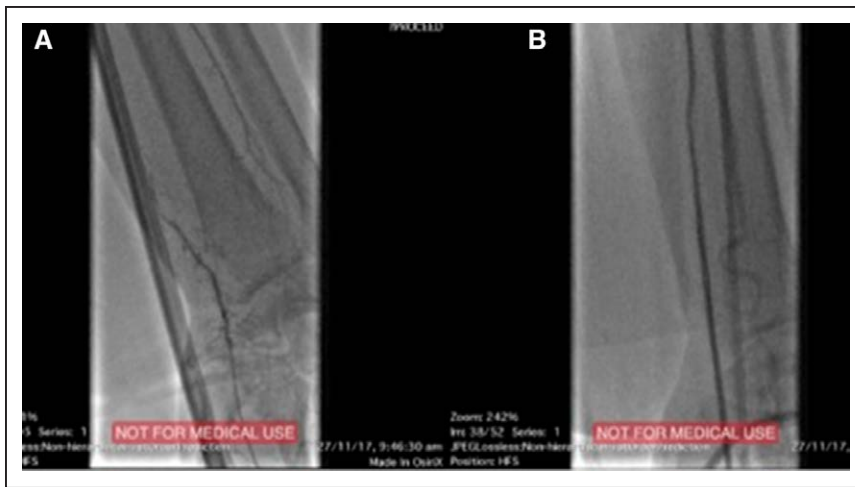


Figure 1. Angiogram of left radial artery at the level of the wrist in the forearm showing (A) occluded left radial artery and (B) widely patent artery after recanalization (Movies I, II, and III in the [Data Supplement](#)).

with hydraulic pressure, through a control injection of heparinized saline with a 10-mL Luer Lock syringe. Subsequently, we secured the dRA access site with a 6F Glidesheath Slender transradial sheath (Figure 2A) and then advanced 6F internal mammary artery guide catheter over the angioplasty guidewire. The guide catheter was engaged to the LIMA, and then PCI to the distal LAD was successfully performed without any complications (Figure 3). Postprocedure angiogram of the RA via sheath showed widely patent artery in the forearm with good flow (Figure 1B). Transradial compression band was applied at the puncture site ensuring patent hemostasis to prevent reocclusion of RA (Figure 2B).

DISCUSSION

Coronary angiography via right RA access at the wrist is the most preferred approach as the operator's working position is on the right side of the patient. The left RA approach is mainly considered in patients with occluded right RA, previous access failure, tortuous anatomy, past or future use of the right RA as free arterial graft, post-coronary artery bypass graft patients requiring LIMA angiography, and patient preference. However,

the left RA approach is associated with an uncomfortable position of the forearm across the right side. Also, the operator needs to bend over the patient, which is ergonomically uncomfortable. In addition, the operator is exposed to higher radiation doses because of the closer proximity to the source of radiation and radiation scatter from the patient.

Recently, the novel dRA access in the anatomic snuff-box has been reported to preserve the RA in the wrist for subsequent potential surgical interventions.³ The dLRA access helps overcome the limitations associated with left RA catheterization, as the arm can be comfortably brought toward the right side of the patient, thus allowing a natural working position for the operator. To obtain the dLRA access, the left hand of the patient is placed over the patient's right groin, and the patient is asked to grasp his thumb under the other fingers, with the hand slightly dorsally and medially abducted. This maneuver brings the artery to the surface of the fossa. After subcutaneous local anesthetic, the artery is punctured using a 19- to 21-gauge needle at 30- to 45-degree angle directed to the point of the strongest pulse, and then 30- to 50-cm floppy tip guidewire is advanced into the forearm. After the procedure, the

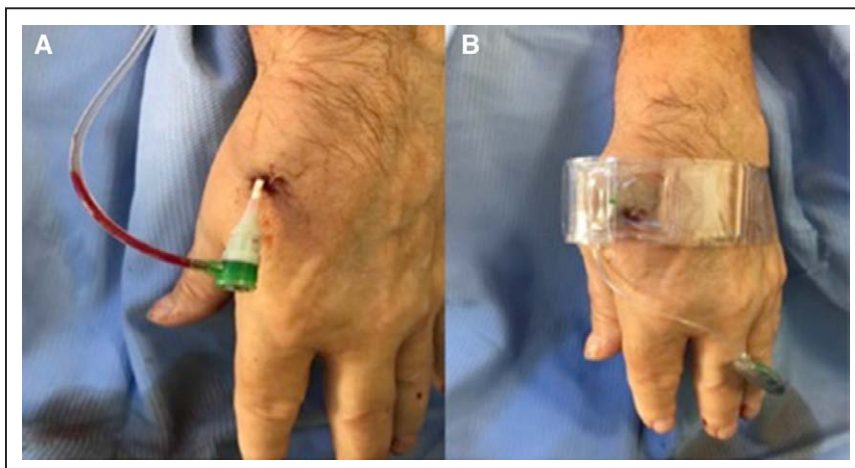


Figure 2. Distal radial artery access in anatomic snuff box. **A**, Secured with 6F radial sheath. **B**, Hemostasis is achieved with air inflatable transradial compression band.

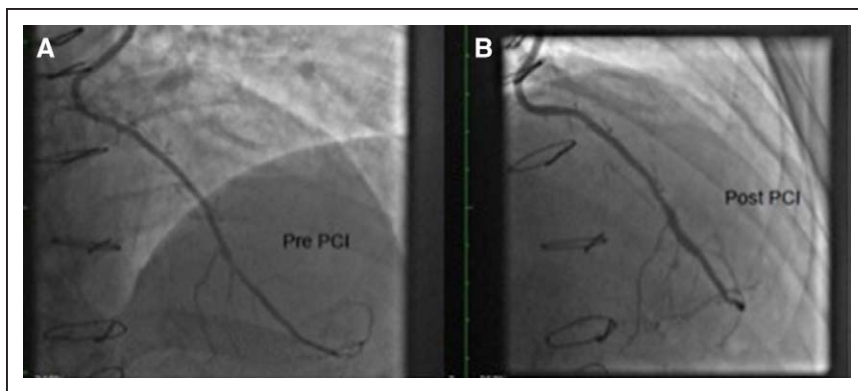


Figure 3. Coronary angiogram pre- and postpercutaneous coronary intervention (PCI).

A, Pre-PCI angiogram image showing severe stenosis at the left internal mammary artery insertion in distal left anterior descending. **B**, Post-PCI angiogram image showing widely patent artery.

sheath is pulled out, and hemostasis is achieved with air inflatable transradial compression band placed over the puncture site as shown in Figure 1B.³

RA occlusion is the most common complication after TRA catheterization, with incidence varying between 1% and 10%.⁴ Although RA occlusion is rarely accompanied by hand ischemia, it is an important complication because it prohibits future TRA access. Radial and ulnar arteries have 2 arterial communications via the superficial and deep palmar arches. In cases of RA occlusion, ulnar artery and palmar arches maintain collateral arterial supply to the palm and the fingers; thus, in most cases, the distal radial pulsation remains intact and can also be localized with the use of ultrasound for access in the anatomic snuffbox. This case report has successfully demonstrated the utilization of the dRA for recanalization of the occluded proximal RA in the wrist and has shown the safe and convenient usage of dLRA access in performing successful PCI to LAD through LIMA from the anatomic snuffbox in the left hand.

In this case, the RA-CTO was relatively recent, therefore, following a predilatation with a 4F micropuncture dilator the lesion was crossed easily with 6F sheath, however, in longstanding RA-CTO progressive predilatation may be required. Additionally, longstanding RA-CTO may also carry a potential higher risk of subintimal penetration and dissection. However, the RA is easily accessible and compressible, which would favor this technique in cases without appropriate arterial access.

ARTICLE INFORMATION

The Data Supplement is available at <http://circinterventions.ahajournals.org/lookup/suppl/doi:10.1161/CIRCINTERVENTIONS.118.006579/-/DC1>.

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