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Successful Crossing of Complex Radial and Brachial Artery Anatomy Using a New Approach: Railtracking

Authors' Contribution:

Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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Case series

Patients: Female, 78-year-old • Male, 68-year-old

Final Diagnosis: Coronary disease

Symptoms: Angina

Medication: —

Clinical Procedure: Coronary angioplasty

Specialty: Cardiology

Objective: Unusual clinical course

Background: Use of the distal transradial artery (dTRA) for coronary angiography and PCI has been shown to be feasible and potentially has multiple advantages over proximal TRA regarding vascular complications, but when larger introducer sheaths (>6 Fr) are used, severe spasm and pain can be induced. However, in comparison with the more proximal part of the radial artery, the distal part is on average 0.5 mm smaller. As a consequence, when using dTRA, the use of slender techniques and miniaturization should be preferred to avoid a large sheath-to-artery mismatch, which has unfavorable consequences. A new approach named RailTracking, using a conventional 6 Fr or 7 Fr guiding catheter and a vascular dilator (the Railway Sheathless Access System [RS] from Cordis Company), allows use of distal arterial access without need for a sheet introducer.





Case Reports: We present 2 clinical cases with a difficult arterial access that were successfully managed using the RailTracking technique by dTRA access. In the first one, the conventional methods of arterial crossing failed because of the tortuosity and severe calcifications in the forearm and brachial artery. In the second case, the proximal TRA was occluded.

Having arterial access on the dTRA and using the RailTracking allowed us to safely perform the interventions without need for vascular access site conversion.

Conclusions: A new approach, RailTracking, which includes sheathless distal radial access and use of the RSS system could potentially decrease the vascular complications and facilitate the crossing, even in cases of complex vessels anatomy.

Keywords: Angioplasty, Balloon, Coronary • Coronary Vessels • Percutaneous Coronary Intervention

Full-text PDF: <https://www.amjcaserep.com/abstract/index/idArt/934760>

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Background

Transradial access (TRA) is associated with lower net adverse clinical event rates than femoral access and is preferred in acute or elective PCI, even for complex procedures [1] but the rate of vascular artery conversion site access remains non-negligible (5.8%) [2].

The use of new device like the Railway sheathless system (RSS) improves the crossing of guiding catheters (even 7Fr) by almost completely eliminating the razor effect of the guide catheter over the 0.035-inch guidewire (Figure 1A, 1B). The RSS is composed by 2 dilators compatible with 0.021-inch or 0.035-inch guidewires, which can be used in a conventional 6 or 7 Fr guide catheter of any shape (Figure 2C, 2D). Once the dilator is introduced through the guiding, the system can be smoothly advanced through the skin without an introducer sheath (RailTracking technique). After retrieving the dilator, the guiding catheter is used for intervention. We present 2 challenging clinical cases in which access to the ascending aorta was obtained using this relatively new device.

Case Reports

Case Report 1

A 78-year-old woman with a past medical history of end-stage renal disease requiring renal replacement therapy and with a recent major limb amputation for end-stage peripheral vascular disease was admitted for acute coronary syndrome and planned for coronary angiography.

The right radial artery pulse was absent and a Terumo (Tokyo, Japan) glidesheath 5 in 6 Fr introducer was placed in the left distal radial artery with difficulty. Unfortunately, the presence of severe calcifications and the tortuosity of the vessel made

crossing of the radial artery by any diagnostic 5Fr catheter impossible, with the patient reporting severe pain in the forearm. Because of the risk of vascular complications secondary to the impossibility to strengthen the artery with any 0.014-inch coronary guidewire (Figure 2A), the balloon-assisted tracking technique [3] of the guide catheter was not attempted.

After crossing and successfully strengthening the radial artery with a Terumo 0.035-inch stiff guidewire, a Tiger catheter was finally advanced but remained blocked in the distal brachial artery (which was very calcified and tortuous as well).

In the end, only the use of a 6 Fr guide catheter pre-loaded with the 0.035-inch-compatible long dilator from the Railway Sheathless system (Cordis, Cardinal Health, US) showed easy crossing and a very good trackability for this complex vascular anatomy, allowing us to complete our diagnostic angiogram (Figure 2B).

Case Report 2

A 68-year-old man with COPD (chronic obstructive pulmonary disease) was admitted for coronary angiography after a non-ST segment elevation myocardial infarction. The coronary angiogram, performed through the proximal right RA, showed a severely calcified stenosis on the distal RCA that was undilatable by scoring and non-compliant balloons.

A rotational atherectomy was planned only 3 days later. The angiogram of the RA, acquired after a resistance was encountered while advancing the 0.035-inch guidewire, showed almost complete occlusion of the artery (Figure 3A). After crossing the occlusion with a 0.014-inch coronary guidewire, a 7 Fr guide catheter, pre-loaded with the 0.021-inch compatible Railway Sheathless system (Cordis, Cardinal Health, US), was painlessly advanced in the artery, with no resistance to its progression, allowing a successful complex PCI of the RCA and a final complete recanalization of the RA (Figure 3B).

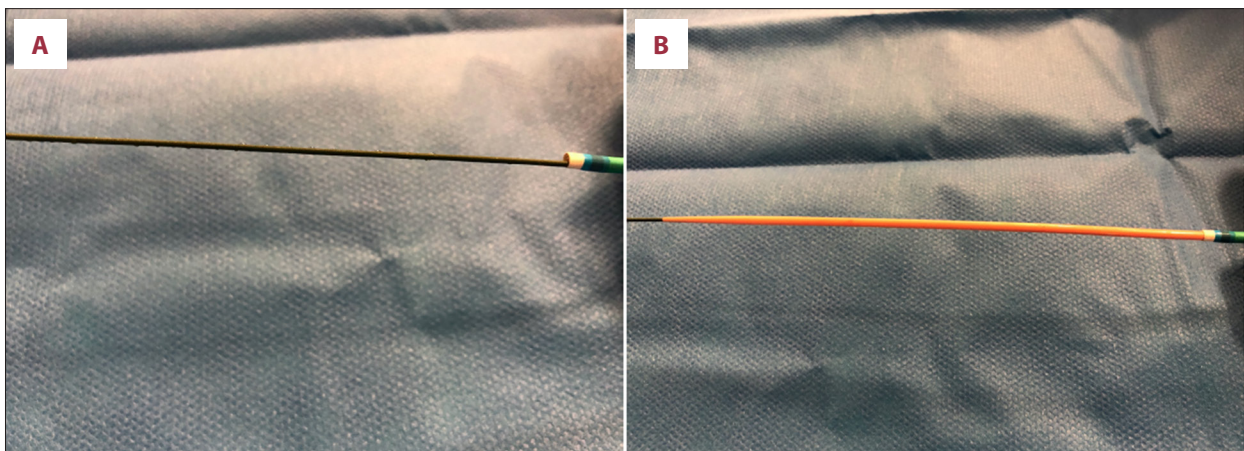


Figure 1. (A) Sharp edge at guide catheter tip works like a “razor blade”. (B) Smooth tapering from RSS dilator and guiding catheter for navigating difficult anatomies.

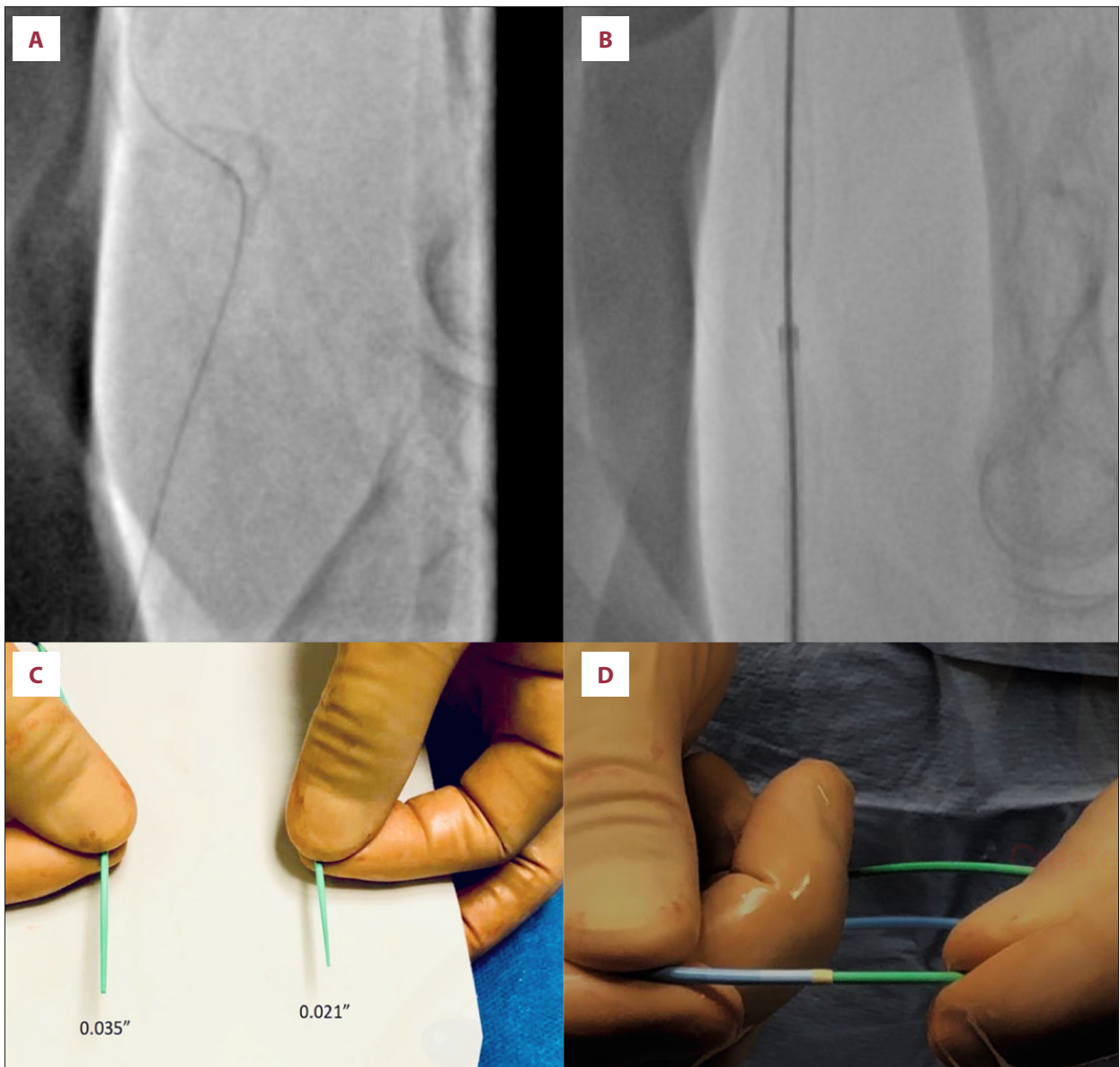


Figure 2. (A) Tortuosity and severe calcification of brachial artery. Difficult crossing with 0.035-inch Terumo guidewire. (B) Successful crossing with the Railway Sheathless Access System. (C) Two sheathes introducer catheters compatible with 0.035-inch or 0.018-inch guide wire. (D) The insertion in the guiding catheter by pushing the back end of the introducer.

Discussion

The radial vascular access for PCI was reported to have fewer vascular complications than the femoral approach in previous studies [4] and is highly recommended by the actual guidelines [5].

Despite its advantages, the rate of conversion from radial to femoral access remains high [6]

and the conventional approaches fail in case of vascular complex anatomy at the level of the arm (eg, tortuosity, smaller

diameter), severe spasm, or the inability of regular catheters to track the vessel architecture.

Different balloon (eg, balloon-assisted tracking, BAT) or catheter techniques, generally a pigtail (pigtail-assisted tracking, PAT), have been described [7] and they are mainly based on creating a transition zone between the wire and the blunt edge of the guiding catheter. The RSS system is the only device that is specially designed to create a smooth transition zone and track the arm vessels.

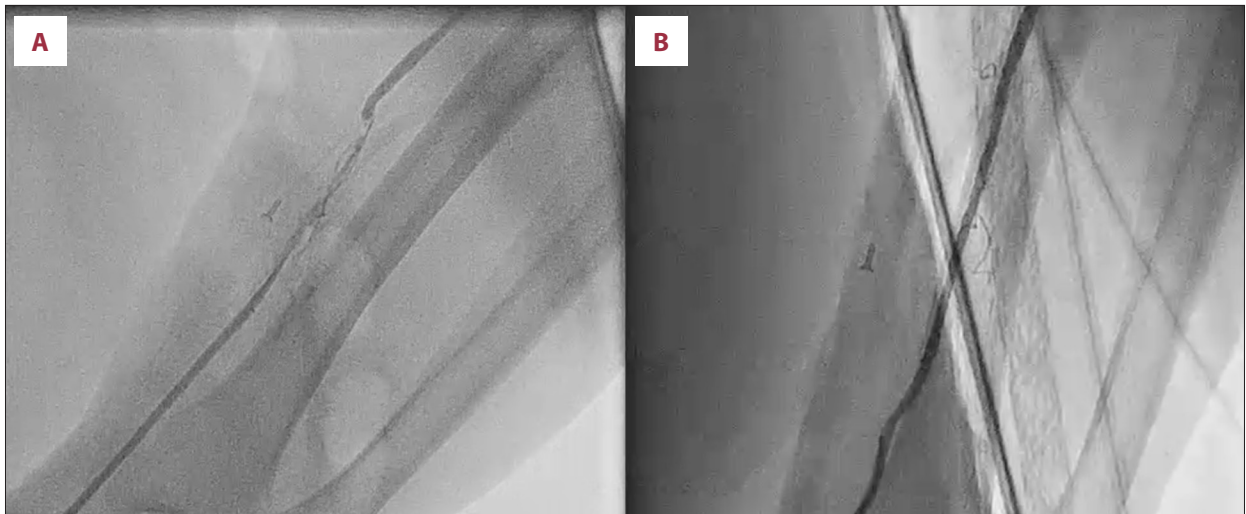


Figure 3. (A) Thrombotic occlusion of the proximal radial artery after the first PCI procedure. (B) Complete recanalization of the radial artery after crossing with the 7Fr guiding catheter.

We presented 2 clinical cases with difficult arterial vascular access that were treated successfully using a new approach, RailTracking, which combines all the advantages of a sheathless distal radial artery access with the use of a dilator-like RSS. In the first case, the distal radial artery was the only vascular access and even in heavily calcified and tortuous brachial the RSS was able to facilitate the crossing. The second patient had a recanalization of the proximal radial artery after distal radial access, as well as use of the 7 Fr guiding catheter and the RSS system, during a complex PCI procedure with rotational atherectomy.

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Conclusions

A new approach, RailTracking, which combines use of a sheathless distal radial access and use of RSS, which limits the razor effect of the catheters, could potentially decrease vascular complications and facilitate the crossing, even in cases of complex vessels anatomy.

Declaration of Figures' Authenticity

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