



ELSEVIER

Contents lists available at ScienceDirect

Journal of Cardiology Cases

journal homepage: www.elsevier.com/locate/jccase

Case Report

Distal radial approach treating a left main lesion during hemostasis of the forearm radial artery on the same side in a case of unstable angina



Fuminobu Yoshimachi (MD, PhD)*, Yota Kawamura (MD, PhD), Hirofumi Nagamatsu (MD), Yuka Karasawa (MD), Nana Murotani (MD), Satoshi Kasai (MD, PhD)

Department of Cardiology, Tokai University Hachioji Hospital, 1838 Ishikawa Machi, Hachioji City, Tokyo 192-0032, Japan

ARTICLE INFO

Article history:

Received 26 April 2021

Revised 25 May 2021

Accepted 9 June 2021

Keywords:

Distal radial approach

Trans-radial approach

Unstable angina pectoris

Percutaneous coronary intervention

ABSTRACT

Conventional radial access (cRA) for percutaneous coronary intervention (PCI) has become the current standard due to low bleeding complications, although recently, distal radial access (dRA) has attracted attention as an alternative. Here, the usefulness of dRA is shown in a case in whom neither side could be used for cRA. The patient was a woman in her 70 s diagnosed with unstable angina pectoris at another hospital. Although ad hoc PCI was attempted via her right forearm radial artery, her hemodynamics deteriorated and the procedure was abandoned. After an intra-aortic balloon pumping device was inserted via the left femoral approach and hemostasis was established with a dedicated device, the patient was transferred to our hospital.

Her right radial artery was being used for hemostasis and her left radial artery was poorly palpable. Because her right distal radial artery was palpable, access via that location was attempted after confirming sufficient blood vessel diameter and blood flow by ultrasound. A 6Fr sheath was inserted and PCI was safely accomplished. Hemostasis on dRA was completed without complications using a hemostasis device. Thus, dRA may be an option as an alternative access site in an emergency.

<Learning objective: Radial access is recommended by the guidelines for coronary intervention in order to prevent access site complications. We report a case of unstable angina successfully treated for a left main lesion via the distal radial artery during hemostasis of the forearm radial artery on the same side. Distal radial access, little considered for catheterization, may be an alternative option when conventional radial access cannot be employed. It is important to share this conclusion with all physicians.>

© 2021 Japanese College of Cardiology. Published by Elsevier Ltd.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Introduction

The usefulness of conventional radial access (cRA) in percutaneous coronary intervention (PCI) is well known and recommended based on evidence of prevention of access site complications including bleeding [1,2]. However, in practice, sometimes cRA is not available for certain clinical reasons and the choice of access site for PCI can be a serious problem. Distal radial access (dRA) offers another access site for PCI, and is now rapidly becoming increasingly accepted because of its many advantages [3,4].

Here, we report the usefulness of dRA in a patient that neither side of cRA could be used for PCI.

Case report

The patient was a woman in her 70 s with a diagnosis of unstable angina. Coronary risk factors were diabetes, hypertension, and dyslipidemia. She had been admitted to a nearby hospital because of increasing chest pain. She underwent medical treatment but her symptoms did not improve. She therefore underwent cardiac catheterization via her right radial artery 3 days after admission, and severe calcified stenosis of the main trunk of the left coronary artery was visible. Although ad hoc PCI was performed after oral dual antiplatelet drug administration, vital shock and ST elevation occurred after inserting the guidewire. An intra-aortic balloon pumping (IABP) device was inserted via the femoral artery, the 6Fr sheath inserted into the right radial artery was removed and hemostasis was performed with TR-Band (Terumo, Tokyo, Japan) prior to transfer to our hospital.

* Corresponding author.

E-mail addresses: yoshimachi-circ@umin.ac.jp, fyoshimachi@nifty.com (F. Yoshimachi).



Figure 1. The distal radial artery was punctured using ultrasound guidance while maintaining hemostasis at the forearm radial artery using TR-Band (Terumo, Tokyo, Japan). After inserting the guide wire, a 6Fr sheath of Prelude IDEAL 6Fr sheath (Merit Medical, South Jordan, UT, USA) was inserted.

ST elevation was improved but chest pain continued. The patient refused surgical treatment and strongly requested PCI. Accordingly, informed consent for PCI was obtained. Poor pulsation of the left radial artery and fair pulsation of the distal radial artery on

the same side of the attached hemostasis band were observed, and sufficient vascular diameter and antegrade blood flow were determined by ultrasound imaging. The right distal radial artery was punctured under ultrasound guidance, and a Prelude IDEAL™ 6Fr sheath (Merit Medical, South Jordan, UT, USA), which was about 1Fr thinner than the conventional sheath, was inserted (Fig. 1).

PCI was performed, supported by IABP. After a hydro-coated guidewire was quickly inserted, a 2.0 × 15 mm balloon was used to stabilize hemodynamics to maintain coronary flow. Intravascular ultrasound (IVUS) was used to investigate lesion characteristics and vessel diameter. A scoring balloon of 3.0 × 10 mm was used for pre-dilatation, and drug-eluting stents (DES) of 2.5 × 33 mm on left anterior descending artery (LAD) and DES of 3.0 × 33 mm from LAD to left main trunk (LMT) ostium were deployed. The kissing balloon technique was used with a 2.5 × 15 mm balloon to circumflex coronary artery and a 3.0 × 15 mm balloon to LAD. Finally, the proximal optimization technique (POT) was performed on LMT with a 5.0 × 8 mm balloon. The procedure was terminated when sufficient lumen could be observed by IVUS and thrombolysis in myocardial infarction 3 flow on angiography (Fig. 2). The Prelude Sync Distal (Merit Medical) was used on the distal radial access as the hemostasis device dedicated to dRA (Fig. 3).

Although the symptoms disappeared and the hemodynamics became stable, hematoma at the femoral puncture site into the IABP was found. The device and the sheath inserted into the femoral artery were removed, and manual compression for hemostasis was performed. However, a pseudoaneurysm formed at the puncture site of the femoral artery on the next day and surgical treatment was necessary.

On the 10th day after admission, the patient was discharged from hospital on foot. At the first outpatient visit about a month later, both right radial and distal radial arteries were palpable, and no complications of motor paralysis and paresthesia were observed.

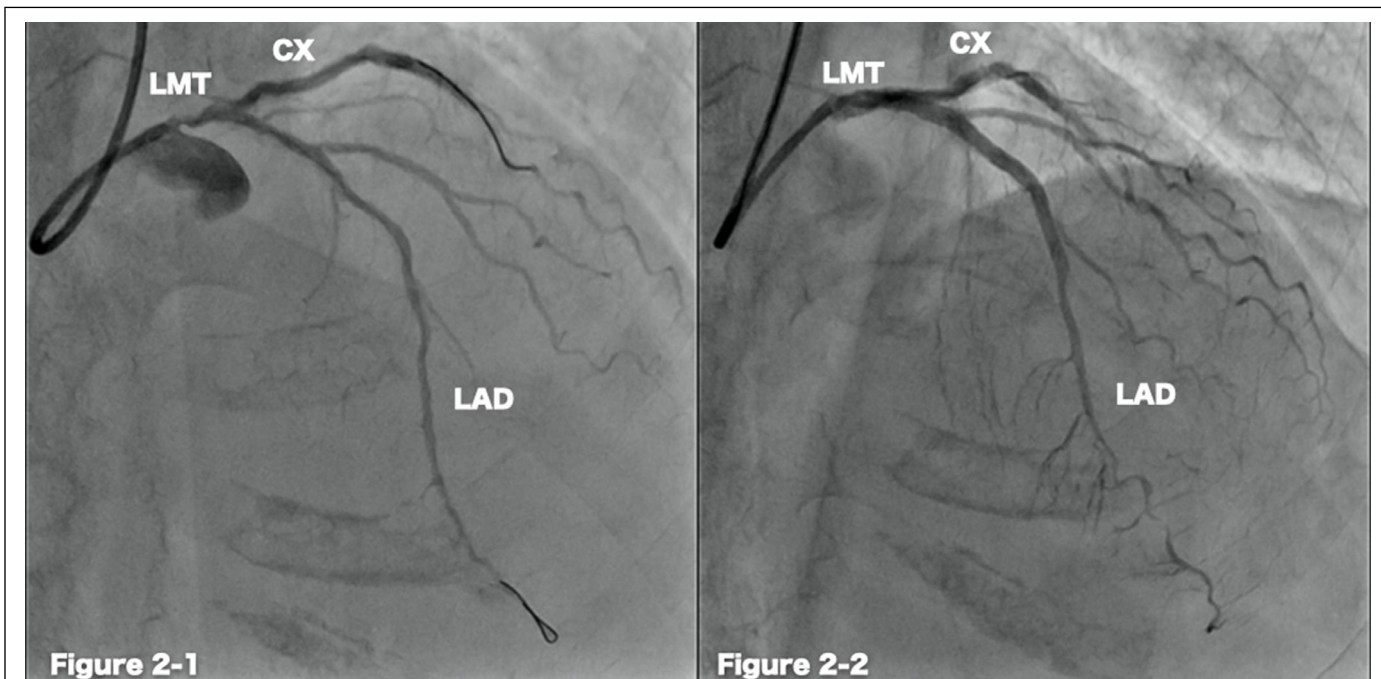


Figure 2. Angiography before intervention (2-1). The guidewires were inserted before angiography because of the wedge position of the guiding catheter at severe stenosis of the ostium of LMT. Angiography after two stents were implanted and the kissing balloon technique and the proximal optimization technique was performed (2-2). LAD, left anterior descending artery; LMT; left main trunk; CX, circumflex coronary artery.

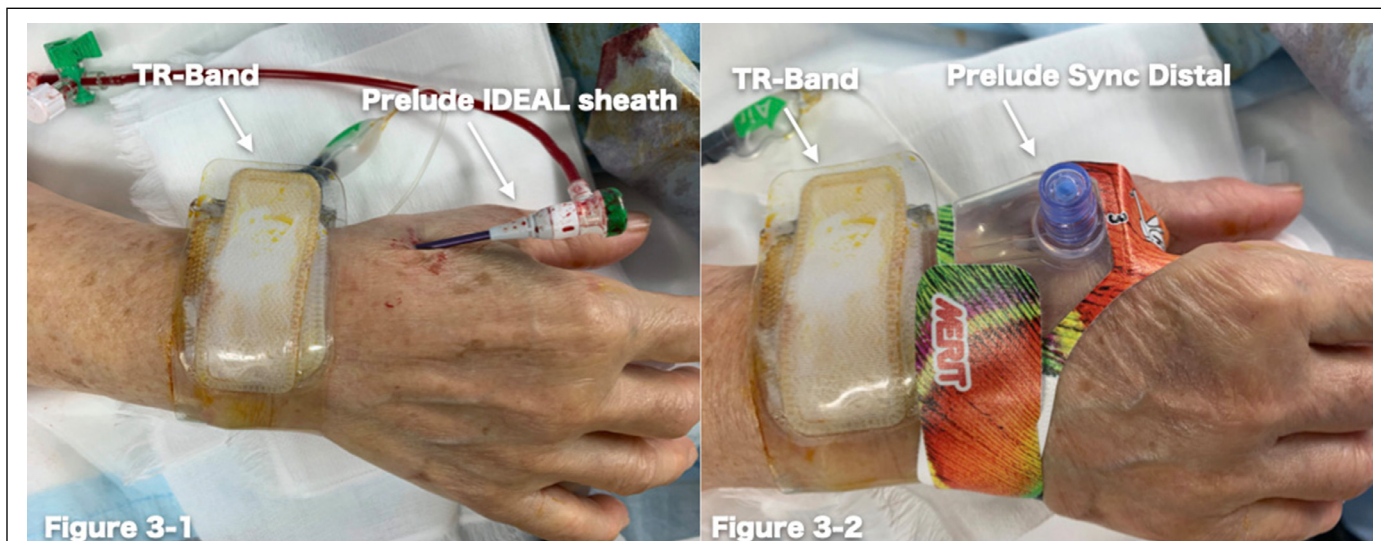


Fig. 3.

A Prelude IDEAL 6Fr sheath (Merit Medical, South Jordan, UT, USA) inserted via distal radial artery while hemostasis was maintained at the forearm radial artery with a compression device of TR-Band (Terumo, Tokyo, Japan) (3-1). Hemostasis at the distal radial artery with a dedicated device for distal radial access of Prelude Sync Distal after coronary intervention (3-2).

Discussion

PCI via the dRA during hemostasis of cRA was performed. This case illustrates one of the useful attributes of dRA on special occasions. Normally, access routes that should be used immediately after cRA will be the contralateral radial artery or femoral artery. However, in the present case, continuous administration of heparin for IABP was the reason why we hesitated to select the right femoral approach. Additionally, by palpation, it seemed that the contralateral radial artery might be of small diameter, which would only be useful for continuously monitoring the aortic pressure line in the intensive care unit.

Even during hemostasis on the proximal side of the artery, the distal site could be used as an access route if the patent hemostasis which was an appropriate hemostasis method of maintaining blood flow [5] was performed.

One of the limitations of this report was the damage of the arteries was not evaluated under ultrasound. Strictly the absence of symptoms could not mean any arterial damage. However, the selection of the access site in the acute phase safely, observing the pulsation of the radial artery and no subjective symptoms or movement disorder were excellent benefits for the patient clinically in this case.

A potential limitation of dRA is the small diameter of the blood vessel and variation of the anatomy [6]. However, difficulties can be avoided in advance by sufficient sonographic investigation. Hemostasis time of dRA tends to be short after the procedure [7], and fewer complications are expected.

Not only in this case but almost all the cases of access via the femoral artery, echo-guided puncture should be recommended to avoid vessel complications including bleeding [8]. On the other hand, dRA can also be used as a primary access site for PCI [9]. However, it may be difficult to accept by many physicians due to

the problem of a learning curve for successful puncture. This is similar to the reason why cRA was not primarily the first choice for PCI in the past. Establishing more evidence of the usefulness of dRA is warranted, and will change this situation. Thus, we have reported here this case in which selection of the access site for PCI in unstable angina was difficult, but finally dRA was useful.

References

- [1] Valgimigli M, Gagnor A, Calabró P, Frigoli E, Leonardi S, Zaro T, Rubartelli P, Brigueri C, Andò G, Repetto A, Limbruno U, Cortese B, Sganzerla P, Lupi A, Galli M, et al. Radial versus femoral access in patients with acute coronary syndromes undergoing invasive management: a randomised multicentre trial. *Lancet* 2015;385:2465–76.
- [2] Chase AJ, Fretz EB, Warburton WP, Klinke WP, Carere RG, Pi D, Berry B, Hilton JD. Association of the arterial access site at angioplasty with transfusion and mortality: the M.O.R.T.A.L study (Mortality benefit Of Reduced Transfusion after percutaneous coronary intervention via the Arm or Leg). *Heart* 2008;94:1019–25.
- [3] Kiemeneij F. Left distal transradial access in the anatomical snuffbox for coronary angiography (IdTRA) and interventions (IdTRI). *EuroIntervention* 2017;13:851–7.
- [4] Yoshimachi F, Ikari Y. Distal radial approach: a review on achieving a high success rate. *Cardiovasc Interv Ther* 2021;36:30–8.
- [5] Pancholy S, Coppola J, Patel T, Roke-Thomas M. Prevention of radial artery occlusion-patent hemostasis evaluation trial (PROPHET study): a randomized comparison of traditional versus patency documented hemostasis after transradial catheterization. *Catheter Cardiovasc Interv* 2008;72:335–40.
- [6] Naito T, Sawaoka T, Sasaki K, Iida K, Sakuraba S, Yokohama K, Sato H, Soma M, Okamura E, Harada T, Yoshimachi F. Evaluation of the diameter of the distal radial artery at the anatomical snuff box using ultrasound in Japanese patients. *Cardiovasc Interv Ther* 2019;34:312–16.
- [7] Koutouzis M, Kontopodis E, Tassopoulos A, Tsiafoutis I, Katsanou K, Rigatou A, Didagelos M, Andreou K, Lazaris E, Oikonomidis N, Maniotis C, Ziakas A. Distal versus traditional radial approach for coronary angiography. *Cardiovasc Revasc Med* 2019;20:678–80.
- [8] Sobolev M, Slovut DP, Lee Chang A, Shiloh AL, Eisen LA. Ultrasound-guided catheterization of the femoral artery: a systematic review and meta-analysis of randomized controlled trials. *J Invasive Cardiol* 2015;27:318–23.
- [9] Soydan E, Akin M. Left distal radial artery access site in primary percutaneous coronary intervention: is it safe? *Balkan Med J* 2020;37:276–80.