



## Short Communication

## Cardiac catheterization through ipsilateral radial and ulnar artery access during the same procedure



Dilip Kumar\*, Madhumanti Panja, Ashesh Halder, Soumya Patra, Arindam Pande, Sanjeev Salil Kumar Mukherjee, Rana Rathor Roy, Ejaz Ahmad Bari, Anil Kumar Singhi

Medica Superspecialty Hospital, Kolkata, India

## ARTICLE INFO

## Article history:

Received 3 October 2020

Accepted 8 March 2021

Available online 26 March 2021

## Keywords:

Cardiac catheterization

Ipsilateral radial artery

Ulnar artery access

PCI

## ABSTRACT

We evaluated the safety and feasibility of ipsilateral radial and ulnar artery cannulation during the same catheterization procedure. Crossover from radial to femoral was done in 122 patients. Both ipsilateral radial and ulnar catheterization were performed in 16 patients without any complications, which was further supported by Doppler ultrasonography.

© 2021 Cardiological Society of India. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

Cardiac intervention through transradial access (TRA) is advantageous over transfemoral coronary angiography (TFA), with lower bleeding, lesser access-related complications, shorter hospital stays, early ambulation, and decreased mortality rate.<sup>1–4</sup> However, crossover rates (5%–8%) because of radial access failure is a major limitation of TRA.<sup>1,2</sup> Transulnar access (TUA) may be an alternative approach to TRA in these scenarios. We assessed the safety and feasibility of dual sheath insertion through ipsilateral TRA and TUA in a clinical setting.

## 2. Methods

We performed a retrospective analysis of all the cardiac catheterizations at our center from 2017 to 2019, initially with TRA approach followed by conversion to ipsilateral TUA (Seldinger technique), such that both sheaths were in situ (Supplementary Figure 1, 2). To prevent spasm, recommended cocktail of vasodilators was used. Pulsed and color Doppler sonography of the ulnar artery was performed seven days post-procedure (5–13-MHZ linear-array transducer, Samsung HS70A) (Supplementary Figure

3A and 3B). The peak systolic and end-diastolic flow velocities were measured for the radial/ulnar artery of the cannulated limb. Normal triphasic pattern was obtained, in all subjects, with peak systolic velocity ranging from 40 cm/s to 47 cm/s and resistive index (RI) from 0.80 to 0.88. Compression was applied using TR BAND® radial compression device for an approximately 4- to 5-h period with a gradual relaxation after the first hour.

## 3. Results

Of 8044 angiography procedures, the initial radial approach was performed in 7881 patients (97.9%). Crossover from radial to femoral was done in 122 patients. Ipsilateral radial and ulnar catheterization (right side) was performed in 16 patients (mean age, 67 years; males, 87.5%). Angiography alone and angiography followed by PCI was done in 11 and 5 patients, respectively. Stable angina was a common indication (14 patients). Ipsilateral TUA and TRA were performed after radial failure because of spasm in 10 patients, radial loop in 5 patients, and dissection in one patient (Supplementary Table 1).

Ipsilateral radial and ulnar catheterization were successful in all patients. Post-procedure ultrasound showed patent radial and ulnar blood flow in all patients. None of the patients had significant peri-procedural bleeding events, or large hematoma or ischemic complications in the right upper limb. Both radial and ulnar arteries were palpable, and Duplex ultrasonography findings were normal in all 16 patients at one-week follow-up.

\* Corresponding author. Certified cardiac device specialist, Consultant interventional cardiologist and electrophysiologist, Chief academic co-ordinator, Medica Institute of Cardiac Science, Kolkata, India.

E-mail address: [dilipcardio@gmail.com](mailto:dilipcardio@gmail.com) (D. Kumar).

#### 4. Discussion and conclusion

Although ipsilateral crossover TUA is a viable option in case of radial failure, its use should not be generalized. This can be used in the following situations<sup>1</sup>: when bleeding risk of femoral approach is very high<sup>2</sup>; TFA is not available because of PAD<sup>3</sup>; contralateral radial and ulnar artery are unavailable<sup>4</sup>; to elucidate ipsilateral ulnar artery beforehand by imaging if TUA is anticipated especially with prior use of ipsilateral radial access; and<sup>5</sup> when radial failure is due to loop or hypoplastic radial artery.

Hand ischemia while performing TUA can be avoided with<sup>1</sup>: use of small sheath size if possible<sup>2</sup>; use of intense appropriate anti-coagulation (UFH 100IU/KG); and<sup>3</sup> short duration of post-procedural compression (less than 2 h). We did not perform Allen's test as recent data are not in favor to predict hand ischemia.<sup>5</sup>

In conclusion, simultaneous cardiac catheterization through ipsilateral radial and ulnar artery access can be considered a feasible and safe procedure in a select patient population, when performed by experienced cardiac interventionalists. However, catheterization from radial and ulnar artery should be opted only when all other access options are exhausted. Further data with large population is needed to establish the safety of ipsilateral radial and ulnar artery access.

#### Source of funding

None.

#### Declaration of competing interest

None.

#### Acknowledgment

We thank Arindam Pande,<sup>1</sup> Sanjeev Salil Kumar Mukherjee,<sup>1</sup> Rana Rathor Roy,<sup>1</sup> Ejaz Ahmad Bari,<sup>1</sup> Anil Kumar Singhi<sup>1</sup> for their additional support for the conduct of the study. We thank BioQuest Solutions Pvt Ltd for providing editorial support for the manuscript.

#### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ihj.2021.03.002>.

#### References

1. Le J, Bangalore S, Guo Y, et al. Predictors of access site crossover in patients who underwent transradial coronary angiography. *Am J Cardiol.* 2015;116:379–383.
2. Burzotta F, Trani C, Mazzari MA, et al. Vascular complications, and access crossover in 10,676 transradial percutaneous coronary procedures. *Am Heart J.* 2012;163:230–238.
3. Jolly SS, Yusuf S, Cairns J, et al. RIVAL Trial Group. Radial versus femoral access for coronary angiography and intervention in patients with acute coronary syndromes (RIVAL): a randomised, parallel group, multicentre trial. *Lancet.* 2011;377:1409–1420.
4. Valgimigli M, Gagnor A, Calabró P, et al. MATRIX Investigators. Radial versus femoral access in patients with acute coronary syndromes undergoing invasive management: a randomised multicentre trial. *Lancet.* 2015;385:2465–2476.
5. Maniotis C, Koutouzis M, Andreou C, et al. Transradial approach for cardiac catheterization in patients with negative allen's test. *J Invasive Cardiol.* 2015 Sep;27(9):416–420. Epub 2015 Jun 15.