Journal of the Society for Cardiovascular Angiography & Interventions 1 (2022) 100385

Contents lists available at ScienceDirect

Journal of the Society for Cardiovascular Angiography & Interventions

journal homepage: www.jscai.org

Editorial

Femoral in the Time of Radial

William J. Prabhu, MD [a], Nathaniel R. Smilowitz, MD, MS [b,c], Giora Weisz, MD [a,d,*]

[a] Hudson Valley NewYork-Presbyterian Hospital and Columbia Interventional Cardiovascular Care, Columbia University Irving Medical Center, New York, New York; [b] New York University School of Medicine, NYU Langone Health, New York, New York; [c] Veterans Affairs New York Harbor Healthcare System, New York, New York; [d] Cardiovascular Research Foundation, New York, New York

"*He was still too young to know that the heart's memory eliminates the bad and magnifies the good and that thanks to this artifice, we manage to endure the burden of the past.*"—Gabriel García Márquez, *Love in the Time of Cholera*

Femoral arterial access has been the standard arterial access approach to diagnostic and interventional coronary procedures for the past 60 years. A shift toward increased use of the radial access has been driven by patient and operator preference, ease of postprocedural care, and clinical data. Initial trials comparing radial to femoral access in patients with acute coronary syndromes and ST-elevation myocardial infarction demonstrated decreased bleeding and suggested a mortality benefit with the radial approach.[1-4] These trials contributed to the growing enthusiasm for the "radial first" approach that culminated in an instrumental change in the coronary revascularization guidelines to favor a radial-first approach.[5] A more recent randomized trial of radial vs femoral access in patients with ST-elevation myocardial infarction was less compelling, with no survival or bleeding benefit associated with a radial-first approach.[6]

In parallel to the rapid adoption of radial access, there have been significant advances in femoral arterial access techniques. This has resulted, in part, from the proliferation of transcatheter aortic valve replacement procedures and the increased need for reliable and safe large-bore arterial access. These technique advances include routine use of fluoroscopic landmarks, ultrasound guidance, use of micropuncture technique, and meticulous use of vascular closure devices (VCDs). Two publications from the same group over a span of a decade demonstrate how femoral access techniques have evolved over time[7,8]; the authors reported better results with improved skills and a modified micropuncture technique, using fluoroscopy to follow the wire, as well as performing contrast angiography through the 4F introducer before upsizing to the larger sheath. For detailed best practices, the reader is referred to the recent updated e-book published by the Society for Cardiovascular Angiography and Interventions.[9]

In this issue of the *Journal of the Society for Cardiovascular Angiography and Interventions*, Kreutz et al[10] provide contemporary data on the safety of femoral access and closure. The authors are to be commended for these large, real-world, multicenter data that incorporate clinical variables and bleeding outcomes with standardized definitions as per the National Cardiovascular Data Registry CathPCI registry. They compared outcomes of VCD vs manual compression in a retrospective analysis of procedures performed in 26,113 patients at a large, multicenter hospital system between 2015 and 2021. The manuscript provides important insights into contemporary clinical practice. The outcomes reported were good, with bleeding in only 1% of all transfemoral arterial procedures, including <0.4% with diagnostic cardiac catheterizations and 1.8% with all transfemoral percutaneous coronary interventions (PCIs). VCDs were associated with lower risks of any bleeding, access site bleeding, access site hematoma, and blood transfusion than manual hemostasis in patients undergoing transfemoral PCI. These findings are similar to a prior case-control study which reported a low rate of femoral complications and the superiority of VCDs compared to manual hemostasis after transfemoral PCI.[11] Interestingly, the current report highlights differences by the type of the VCD, with fewer bleeding events associated with the use of the Angio-Seal or Perclose devices than with the Mynx VCD. No differences in bleeding outcomes with the VCD vs manual hemostasis were observed in patients undergoing diagnostic catheterization. This may have been related to the frequent use of 4F access and the absence of an indication for anticoagulation in these patients.

Since prior randomized controlled trials that demonstrated decreased bleeding risks with radial access were primarily performed in the era of adjuvant glycoprotein IIb/IIIa inhibitor use and since a recent randomized trial failed to demonstrate survival benefit with radial access, the current report contributes to the notion that femoral arterial access with modern techniques remains a viable arterial approach for PCI. Radial artery access is not always feasible due to prior access trauma, arterial occlusions, and severe subclavian/innominate tortuosity, and when a complex procedure is anticipated, femoral access can provide better guide support. With the recent class I recommendation to use radial arteries as a preferred bypass conduit, some may avoid traumatizing the radial artery during access when there is high probability of surgical revascularization.

DOI of original article: https://doi.org/10.1016/j.jscai.2022.100370.
Keywords: arterial access; femoral; radial; vascular closure device.
* Corresponding author: gw2128@cumc.columbia.edu (G. Weisz).

https://doi.org/10.1016/j.jscai.2022.100385
Received 12 May 2022; Accepted 14 May 2022
Available online 29 June 2022

With the significant increase in the adoption of radial access for PCI in recent years, challenges remain to ensure that interventional cardiologists cultivate quality femoral access skills. This issue may be particularly imperative for fellows and young interventional cardiologists who may have limited experience with, and exposure to, complex transfemoral cases. It is also critical that staff in the postprocedural care areas maintain adequate experience with transfemoral access and management of access site complications and bleeding. The routine management of patients with both transradial and transfemoral arterial access is crucial to the performance of a high-quality cardiac catheterization laboratory. Societies may consider setting specific guidelines on the volume or proportion of procedures performed via transfemoral arterial access during interventional cardiology fellowship before certifying large-bore arterial access for transcatheter aortic valve replacement or percutaneous ventricular assist devices. Even beyond fellowship training, access site performance and related complications should be monitored for each operator as well for each center with a model in place for continued skill refinement with current techniques.

What is the role of femoral access in the time of radial? Rather than a "radial access at all costs" approach that many have championed, perhaps we should focus on the patient-centered approach for access site selection that can facilitate safe and successful PCI. Femoral arterial access and closure can be safe, especially when attentive techniques are exercised by skilled operators. Arterial access is the first step in percutaneous revascularization. Our heart's memory of femoral access should not eliminate the bad and magnify the good. Caution and safety come first.

Declaration of competing interest

Dr Smilowitz was supported, in part, by the National Heart, Lung, and Blood Institute of the National Institutes of Health under Award Number K23HL150315 and served on an advisory board for Abbott Vascular. Dr Prabhu and Dr Weisz reported no conflict of interest related to this editorial content.

References

1. Valgimigli M, Gagnor A, Calabro P, et al. Radial versus femoral access in patients with acute coronary syndromes undergoing invasive management: a randomised multicentre trial. *Lancet*. 2015;385(9986):2465–2476. https://doi.org/10.1016/S0140-6736(15)60292-6
2. Jolly SS, Yusuf S, Cairns J, et al. 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(9775):1409–1420. https://doi.org/10.1016/S0140-6736(11)60404-2
3. Bernat I, Horak D, Stasek J, et al. ST-segment elevation myocardial infarction treated by radial or femoral approach in a multicenter randomized clinical trial: the STEMI-RADIAL trial. *J Am Coll Cardiol*. 2014;63(10):964–972. https://doi.org/10.1016/j.jacc.2013.08.1651
4. Romagnoli E, Biondi-Zoccai G, Sciahbasi A, et al. Radial versus femoral randomized investigation in ST-segment elevation acute coronary syndrome: the RIFLE-STEACS (Radial versus Femoral Randomized Investigation in ST-Elevation Acute Coronary Syndrome) study. *J Am Coll Cardiol*. 2012;60(24):2481–2489. https://doi.org/10.1016/j.jacc.2012.06.017
5. Lawton JS, Tamis-Holland JE, Bangalore S, et al. 2021 ACC/AHA/SCAI guideline for coronary artery revascularization: a report of the American College of Cardiology/American Heart Association Joint Committee on clinical practice guidelines. *J Am Coll Cardiol*. 2022;79(2):e21–e129. https://doi.org/10.1016/j.jacc.2021.09.006
6. Le May M, Wells G, So D, et al. Safety and efficacy of femoral access vs radial access in ST-segment elevation myocardial infarction: the SAFARI-STEMI randomized clinical trial. *JAMA Cardiol*. 2020;5(2):126–134. https://doi.org/10.1001/jamacardio.2019.4852
7. Ben-Dor I, Maluenda G, Mahmoudi M, et al. A novel, minimally invasive access technique versus standard 18-gauge needle set for femoral access. *Catheter Cardiovasc Interv*. 2012;79(7):1180–1185. https://doi.org/10.1002/ccd.23330
8. Ben-Dor I, Sharma A, Rogers T, et al. Micropuncture technique for femoral access is associated with lower vascular complications compared to standard needle. *Catheter Cardiovasc Interv*. 2021;97(7):1379–1385. https://doi.org/10.1002/ccd.29330
9. Shroff A, Pinto D. Vascular access, management, and closure: best practices (eBook). The Society for Cardiovascular Angiography and Interventions; 2019. Accessed May 11, 2022. https://scai.org/publications/ebooks/vascular-access-management-and-closure-best-practices
10. Kreutz RP, Phookan S, Bahrami H, et al. Femoral artery closure devices vs manual compression during cardiac catheterization and percutaneous coronary intervention. *JSCAI*. 2022;1(5):100370.
11. Smilowitz NR, Kirtane AJ, Guiry M, et al. Practices and complications of vascular closure devices and manual compression in patients undergoing elective transfemoral coronary procedures. *Am J Cardiol*. 2012;110(2):177–182. https://doi.org/10.1016/j.amjcard.2012.02.065