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Distal transradial access to prevent proximal radial artery occlusion: what is really known?

Acesso radial distal para prevenir a oclusão proximal da artéria radial: o que realmente se sabe?

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Transradial access (TRA) offers important advantages over transfemoral approaches, including early patient ambulation, improved patient comfort, less vascular complications, lower health care costs, and reduced adverse cardiovascular events, including mortality.¹ Nevertheless, complications of TRA still exist, and radial artery occlusion (RAO) occurred in up to 30% of cases, in a prospective vascular ultrasound study.² Due to dual blood supply to the hand, RAO is usually asymptomatic and unnoticeable, although sometimes it may be associated with distal ischemia, paresthesia, pain at the site of occlusion, and loss of hand function.³ Most importantly, RAO may prevent future use of the radial artery (RA) for hemodialysis fistula creation, surgical coronary artery bypass grafting, reconstructive surgery, and repeat TRA procedures.¹

Distal TRA (dTRA) has recently gained large popularity worldwide. As a refinement of the standard proximal TRA (pTRA), this relatively new technique may have additional advantages, in terms of patient's and operator's comfort, faster haemostasis, and risk of proximal RAO (pRAO).⁴ Importantly, in cases of RAO, since arterial puncture with dTRA is performed after the point of emergence of the superficial palmar branch of the RA, blood flow through the palmar arch would not be compromised and, therefore, the risk of ischemic injury would be minimum.¹

Coomes et al. published a systematic scoping review of 19 publications, comprising 4,212 participants undergoing cardiac catheterization via dTRA. The overall success rate using dTRA was 95.4% (69% to 100%). Proximal RAO was very low (1.7%).⁵

In another contemporary study, Eid-Lidt et al. reported the first randomized comparison of dTRA *versus* pTRA during coronary angiography and/or percutaneous coronary interventions (PCI), evaluating the rates of pRAO documented by Doppler ultrasound (US). Compared with patients with pTRA, those using dTRA had significantly lower rates of pRAO at 24 hours (8.4% *versus* 5.6%; $p=0.002$) and 30 days (8.8% *versus* 6.4%; $p=0.019$), respectively.

Mizuguchi et al. evaluated 228 patients submitted to coronary angiography and/or PCI, and only one patient (0.4%) presented pRAO on Doppler US.⁷ Finally, in a meta-analysis by Hamand et al. assessing five studies – four observational and one randomized – comprising 6,746 patients who underwent coronary angiography and/or PCI, the authors reported lower rates of pRAO with dTRA compared with pTRA (2.3% *versus* 4.9%; $p=0.004$).⁸

In the Journal of Transcatheter Interventions, Tebet et al. reported their experience with dTRA, in a retrospective and observational study including consecutive 51 patients submitted to coronary angiography and/or PCI (98.1% via right dTRA, with Glidesheath Slender 5/6F). The aim was to evaluate the impact of dTRA on RAO and access-site related bleeding complications. No pRAO was documented by Doppler US at 24 hours after sheath removal and hemostasis.⁹ Despite the small sample size and lack of longer Doppler US evaluation, as in the above mentioned studies, the authors should be congratulated for their brilliant work.

The ongoing randomized DISCO Radial Trial (ClinicalTrials.gov identifier: NCT04171570) will evaluate 1,300 individuals, aiming to demonstrate superiority of dTRA over pTRA, in terms of pRAO, by Doppler US.¹⁰

In our own experience, patients referred to the cath lab since February 2019, have been continuously included in the DISTRACTION (DIStal TRAnsradial access as default approach for Coronary angiography and intervenTIONS) registry (ensaiosclnicos.gov.br Identifier: RBR-7nzzkm).¹¹⁻¹⁹ To date, more than 2,750 consecutive patients submitted to coronary angiography and/or PCI via dTRA have been enrolled. No significant access site-related hematoma (EASY²⁰ type >1) was recorded. There was no documentation of hand/thumb dysfunction after any procedure. One patient developed a pseudoaneurysm after right dTRA coronary angiography and ad hoc PCI, successfully managed by US-guided prolonged TR band® neck compression. Although our cohort lack Doppler US evaluation, distal and proximal RA pulses were palpable in all patients at hospital discharge. Notwithstanding this limitation, performing dTRA without ultrasound guidance might facilitate the widespread use of the technique.

In conclusion, alongside with the widespread adoption of dTRA by different operators worldwide, continuous evidence of pRAO reduction has been published, thus reinforcing the idea that dTRA appears to be feasible, safe, and generalizable, for the majority of patients undergoing diagnostic coronary angiography and PCI. Further and larger randomized trials are warranted and expected, to assure the clinical benefits and safety of this relatively new and potential disruptive technique.¹⁴

REFERENCES

1. Sgueglia GA, Di Giorgio A, Gaspardone A, Babunashvili A. Anatomic basis and physiological rationale of distal radial artery access for percutaneous coronary and endovascular procedures. *JACC Cardiovasc Interv.* 2018;11(20):2113-9. <https://doi.org/10.1016/j.jcin.2018.04.045>
2. Uhlemann M, Möbius-Winkler S, Mende M, Eitel I, Fuernau G, Sandri M, et al. The Leipzig prospective vascular ultrasound registry in radial artery catheterization: impact of sheath size on vascular complications. *JACC Cardiovasc Interv.* 2012;5(1):36-43. <https://doi.org/10.1016/j.jcin.2011.08.011>
3. Wagoner JF, Rao SV. Radial artery occlusion after transradial approach to cardiac catheterization. *Curr Atheroscler Rep.* 2015;17(3):489. <https://doi.org/10.1007/s11883-015-0489-6>
4. Corcos T. Distal radial access for coronary angiography and percutaneous coronary intervention: A state-of-the-art review. *Catheter Cardiovasc Interv.* 2019;93(4):639-44. <https://doi.org/10.1002/ccd.28016>
5. Coomes EA, Haghbayan H, Cheema AN. Distal transradial access for cardiac catheterization: A systematic scoping review. *Catheter Cardiovasc Interv.* 2020;96(7):1381-9. <https://doi.org/10.1002/ccd.28623>
6. Eid-Lidt G, Rivera Rodríguez A, Jimenez Castellanos J, Farjat Pasos JL, Estrada López KE, Gaspar J. Distal radial artery approach to prevent radial artery occlusion trial. *JACC Cardiovasc Interv.* 2021;14(4):378-85. <https://doi.org/10.1016/j.jcin.2020.10.013>
7. Mizuguchi Y, Izumikawa T, Hashimoto S, Yamada T, Taniguchi N, Nakajima S, et al. Efficacy and safety of the distal transradial approach in coronary angiography and percutaneous coronary intervention: a Japanese multicenter experience. *Cardiovasc Interv Ther.* 2020;35(2):162-167. <https://doi.org/10.1007/s12928-019-00590-0>
8. Hamandi M, Saad M, Hasan R, Megaly M, Abbott JD, Dib C, et al. Distal versus conventional transradial artery access for coronary angiography and intervention: a meta-analysis. *Cardiovasc Revasc Med.* 2020;21(10):1209-13. <https://doi.org/10.1016/j.carrev.2020.03.020>
9. Tebet M, Ogama MH, Kreimer S, Santos EM, Andrade PB, Zukowski CN, et al. Avaliação de oclusão da artéria radial em pacientes submetidos a procedimentos coronários diagnósticos e terapêuticos pelo acesso radial distal. Um estudo observacional retrospectivo (RDISTAL DOR). *J Transcat Intervent.* 2021;29:eA20210011. <https://doi.org/10.31160/JOTCI202129A20210011>
10. Aminian A. DISCO Radial Trial: DIStal Versus COventional RADIAL Access for Coronary Angiography and Intervention: A Randomized Multicenter Trial. *ClinicalTrials.gov*. Bethesda (MD); U. S. National Library of Medicine; 2019. [cited 2021 Apr 15]. Available from: <https://clinicaltrials.gov/ct2/show/NCT04171570>. *ClinicalTrials.gov Identifier:* NCT04171570
11. Oliveira MD, Navarro EC, Kiemeneij F. Distal transradial access as default approach for coronary angiography and interventions. *Cardiovasc Diagn Ther.* 2019;9(5):513-9. <https://doi.org/10.21037/cdt.2019.09.06>
12. Oliveira MD, Navarro EC, Caixeta A. IVUS-guided DK-crush left anterior descending-diagonal complex bifurcation PCI via redo distal transradial access [letter]. *J Xiangya Med.* 2020;5:20.
13. Oliveira MD, Navarro EC, Tavares F, Caixeta A. Ostial left anterior descending (unprotected left main) primary percutaneous coronary intervention via distal transradial access in the setting of cardiogenic shock due to anterior ST-segment elevation myocardial infarction. *J Transcat Intervent.* 2020;28:eA2020000017. <https://doi.org/10.31160/JOTCI202028A2020000017>
14. Oliveira MD, Caixeta A. Distal transradial access (dTRA) for coronary angiography and interventions: a quality improvement step forward? [editorial]. *J Invasive Cardiol.* 2020;32(9):E238-E239. PMID: 32865510.
15. Oliveira MD, Barros TR, Caixeta A. Spontaneously sealed forearm radial artery perforation during a left distal transradial coronary intervention. *J Invasive Cardiol.* 2020;32(11):E303-E304. PMID: 33130601.
16. Oliveira MD, Trigueiro V, Batista IR, Caixeta A. Conservative type III coronary perforation management: when the basic treatment is life-saving. *J Transcat Intervent.* 2020;28:eA202000028. <https://doi.org/10.31160/JOTCI202028A202000028>
17. Oliveira MD, Navarro EC, Caixeta A. Huge cavity spilling coronary perforation management: when the basic works well. *J Invasive Cardiol.* 2020;32(12):E373-E374. PMID: 33257587.
18. Oliveira MD, Navarro EC, Alves de Sá G, Santos GM, Vieira Ribeiro Garcia ME, Alves Banzatti Viana R, et al. Complex coronary intervention via right distal transradial access with lusoria subclavian artery under refractory electrical storm: a really challenging case. *J Invasive Cardiol.* 2021;33(1):E65-E66. PMID: 33385989.

19. Oliveira MD, Lyra FG, Trigueiro Neto V, Caixeta A. Bilateral distal transradial access for ostial left anterior descending chronic total occlusion recanalization. *J Invasive Cardiol.* 2021;33(2):E138. PMID: 33531444.
20. Bertrand OF, De Larochellière R, Rodés-Cabau J, Proulx G, Gleeton O, Nguyen CM, et al.; Early Discharge After

Transradial Stenting of Coronary Arteries Study Investigators. A randomized study comparing same-day home discharge and abciximab bolus only to overnight hospitalization and abciximab bolus and infusion after transradial coronary stent implantation. *Circulation.* 2006;114(24):2636-43. doi: 10.1161/CIRCULATIONAHA.106.638627