Editorial

Transradial approach for post-coronary artery bypass graft patients: is it worth the efforts?

Abordagem transradial para pacientes após cirurgia de revascularização miocárdica: valerá a pena o esforço?

There is now overwhelming evidence that the transradial approach confers several significant benefits over the traditional femoral access for diagnostic angiography and percutaneous coronary intervention (PCI).[1] Indeed, due to its superficial location, the radial artery is easily compressed once the procedure is completed, hence virtually eliminating the risks of severe access-site complications or bleeding. As a result, post-procedure recovery and ambulation is rapid and allows for same-day discharge in many cases. Overall, streamlining the peri-procedural care while limiting the risks of complications has a major impact on reducing the costs associated with diagnostic angiography or PCI. In some clinical scenarios, such as primary PCI, the transradial approach has even been associated with significant mortality reduction when compared with the femoral approach, although the exact mechanisms remain to be debated and are unlikely to be attributed solely to a reduction in access-site related complications and bleeding.[2]

A better recognition of the benefits of the radial approach has led international scientific societies to raise awareness and to suggest the transradial approach to be prioritized in specific scenarios, such as acute coronary syndromes, in which a greater clinical benefit has been demonstrated in large randomized trials and in which potent antiplatelet and anticoagulant therapies are required to optimize PCI results. Therefore, it is not surprising that the transradial approach is increasing worldwide, even in countries that have remained reluctant to adopt it for a long time, such as the USA. In Brazil, analysis of data spontaneously reported to the National Registry of Cardiovascular Interventions *(Central Nacional de Intervenções Cardiovasculares* – CENIC) showed that, from 2003 to 2008, the radial approach choice increased from 2.8 to 14% and was associated with significant reduction of vascular complications in comparison to femoral approach (2.5 vs. 3.6%; $p < 0.0001$). The recent Acute Coronary Care Evaluation of Practice (ACCEPT) registry showed 30.3% radial approach use for primary PCI.[3]

Yet the data regarding the use of transradial approach in post-coronary artery bypass graft patients remain limited. Indeed, a PubMed search retrieved less than ten manuscripts devoted to that topic. Thus, Andrade et al.[4] should be commended for providing their results, which nicely add up to the available data. It is worth mentioning that post-coronary artery bypass graft patients in the two largest randomized trials, RIVAL and MATRIX, represented only < 3.5% of included patients.[5,6] In the report by Andrade et al., however, post-coronary artery bypass graft patients represented 7.1% of the total number of procedures completed during the study period. It should be noted that, in this single center study, post-coronary artery bypass graft patients were older and had a higher percentage of women when compared with similar studies with non-coronary artery bypass graft patients. Both factors have been associated with higher risk of radial access failure, presumably due to a higher incidence of severe vessel tortuosities and loops in the upper extremities.[7] Therefore, it is not surprising that this report, similar to previous studies, reported a > 5% cross-over rate to standard femoral approach.

Similar to the findings in the only randomized study comparing radial and femoral access in post-coronary artery bypass graft patients, Andrade et al. found higher fluoroscopy time associated with transradial approach. The issue of longer fluoroscopy time and higher radiation exposure with transradial approach is frequently used against transradial approach. We have recently shown that, while 20 years ago the excess in fluoroscopy time using the transradial approach amounted to around 1 to 2 minutes, this difference was close to ~30 seconds in 2014, due to higher experience with the transradial approach and improved radiological equipment and techniques.[8,9] It must also be emphasized that special catheter manipulation, such as cannulating the left mammary artery from the right radial artery, can be technically challenging and might require extra time.[10] As shown in this report, it must be noted that no difference in radiation exposure was noted in the sub-group of patients undergoing PCI. This reinforces the notion that, once diagnostic or guiding catheters are positioned in the ascending aorta, the operating physician works in a similar way, regardless of the access site.

In this report, procedural success and access-site related complications were similar in both groups. This highlights that, with current equipment and catheter sizes (6 F), almost all types of PCI can be performed via the transradial approach, with similar success rates when compared with the traditional femoral approach. The comparable and lower rate of vascular complications in this study can be explained by several factors, such as higher rate of diagnostic and 5 F-based procedures in the femoral sub-group. Other studies have shown a significant reduction in access-site related complications and faster hospital discharge in post-coronary artery bypass graft patients with transradial approach.[11-13]

In conclusion, catheterization and intervention in post-coronary artery bypass graft patients remain more technically chal-

DOI of original article: http://dx.doi.org/10.1016/j.rbci.2015.06.003

lenging. However, since those patients are at a particularly higher risk of vascular complications and peri-procedural bleeding, they are also those who will benefit the most from the transradial approach.

Conflicts of interest

The authors declare no conflicts of interest.

References

1. Bertrand OF, Belisle P, Joyal D, Costerousse O, Rao SV, Jolly SS, et al. Comparison of transradial and femoral approaches for percutaneous coronary interventions: a systematic review and hierarchical Bayesian meta-analysis. Am Heart J. 2012; 163(4):632-48.
2. Bertrand OF, Patel T. Radial approach for primary percutaneous coronary intervention: ready for prime time?. J Am Coll Cardiol. 2012;60(24):2500-3.
3. Labrunie A, Andrade PB, Tebet MA, Nogueira EF, Rinaldi FS, Ribeiro H, et al. Coronary interventional cardiology and transradial approach in Brazil. J Inv Cardiol. 2013;25:3E (abstract).
4. Andrade PB, Nogueira EF, Rinaldi FS, Bienert IRC, Barbosa RA, Bergonso MH, et al. Comparação entre as vias de acesso femoral e radial em procedimentos coronários invasivos após cirurgia de revascularização miocárdica. Rev Bras Cardiol Invasiva. 2015;23(1):8-11.
5. Jolly SS, Yusuf S, Cairns J, Niemelä K, Xavier D, Widimsky P, 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(9775):1409-20. Erratum in: Lancet. 2011;377(9775):1408; Lancet. 2011;378(9785):30.
6. Valgimigli M, Gagnor A, Calabró P, Frigoli E, Leonardi S, Zaro T, et al.; MATRIX Investigators. Radial versus femoral access in patients with acute coronary syndromes undergoing invasive management: a randomised multicentre trial. Lancet. 2015;pii: S0140-6736(15)60292-6 .
7. Abdelaal E, Brousseau-Provencher C, Montminy S, Plourde G, MacHaalany J, Bataille Y, et al.; Interventional Cardiologists at Quebec Heart-Lung Institute. Risk score, causes, and clinical impact of failure of transradial approach for percutaneous coronary interventions. JACC Cardiovasc Interv. 2013;6(11):1129-37.
8. Abdelaal E, Plourde G, MacHaalany J, Arsenault J, Rimac G, Déry JP, et al.; Interventional Cardiologists at Quebec Heart-Lung Institute. Effectiveness of low rate fluoroscopy at reducing operator and patient radiation dose during transradial coronary angiography and interventions. JACC Cardiovasc Interv. 2014;7(5):567-74.
9. Plourde G, Pancholy S, Nolan J, Radiation exposure in relation to arterial access used for diagnostic coronary angiography and percutaneous coronary interventions: a systematic review and meta-analysis. The Lancet. 2015;in press.
10. Tizon-Marcos H, Bagur R, Bertrand OF. How to perform selective angiography and percutaneous coronary intervention through a left mammary artery from the right radial artery?. Indian Heart J. 2010;62(3):262-3.
11. Bundhoo SS, Earp E, Ivanauskiene T, Kunadian V, Freeman P, Edwards R, et al. Saphenous vein graft percutaneous coronary intervention via radial artery access: safe and effective with reduced hospital length of stay. Am Heart J. 2012; 164(4):468-72
12. Rathore S, Roberts E, Hakeem AR, Pauriah M, Beaumont A, Morris JL. The feasibility of percutaneous transradial coronary intervention for saphenous vein graft lesions and comparison with transfemoral route. J Interv Cardiol. 2009; 22(4):336-40.
13. Sanmartin M, Cuevas D, Moxica J, Valdes M, Esparza J, Baz JA, et al. Transradial cardiac catheterization in patients with coronary bypass grafts: feasibility analysis and comparison with transfemoral approach. Catheter Cardiovasc Interv. 2006;67(4):580-4.

Olivier F. Bertrand*, Alberto Barria Perez
Quebec Heart-Lung Institute, Quebec, Canada

*Corresponding author: Interventional Cardiology, Quebec Heart-Lung Institute, Faculty of Medicine, Laval University, Quebec City, Qc, Canada.
E-mail: olivier.bertrand@crhl.ulaval.ca (O.F. Bertrand).