EDITORIAL

Coronary Artery Bypass Grafting Using Bilateral Internal Mammary Artery Without Cardiopulmonary Bypass

Cirugía coronaria con doble arteria mamaria y sin circulación extracorpórea

EDUARDO TURNER[1]

The article by Navia et al., Off-Pump Coronary Artery Bypass Grafting Using Bilateral Internal Mammary Artery: Clinical Follow-up and 20-Year Postoperative Survival (1), is highly relevant for several reasons. First, a large number of patients with follow-up extending up to 20 years, and two aspects not necessarily related: on the one hand, the exclusive use of both internal mammary arteries to achieve complete myocardial revascularization, and on the other hand, the fact that the surgery was performed in all patients without cardiopulmonary bypass (CPB).

Although not explicitly stated in the article, this is the gold standard in coronary artery bypass grafting at the Instituto Cardiovascular de Buenos Aires (ICBA). It would have been useful to clarify in which patients or clinical situations the use of both internal mammary arteries is avoided or surgery is performed with CPB. However, the data shown in Table 1 are similar to those reported in previous reports on CABG.

Avoidance of the morbidity and costs associated with CPB led to the development of off-pump coronary artery bypass (OPCAB) surgery toward the end of the last century. This was followed by considerable enthusiasm, which gradually declined as surgical outcomes revealed a higher incidence of ischemic complications related to graft occlusion. Currently, this technique is used in no more than 20% of patients (2) and mainly at institutions with surgeons specifically dedicated to this technique to optimize outcomes. (3) It is self-evident that performing CABG without the advantages of a stopped and empty heart, as provided by CPB and cardioplegia, requires a significant learning curve that can only be overcome through specialized training and mentorship by experienced surgeons. This learning curve encompasses not only the construction of the anastomoses but also the exposure of the lateral and inferior walls of the left ventricle, for which anesthesia is required for hemodynamic management—a process that can be extremely challenging.

The advantage of avoiding CPB-related morbidity seems to be overstated given the continuous advances in oxygenators and intraoperative management, as demonstrated by numerous studies on both CABG with CPB and comparisons between the two techniques. (4)

The use of both internal mammary arteries in CABG —which, notably, in the case of the article by Navia et al., is not only an OPCAB, but also involves revascularization of all three areas of the heart, resulting in exceptionally good results in terms of both extremely low morbidity and mortality, operative and in the long-term follow-up—is also controversial. (5)

The manner in which both mammary arteries are combined is novel and also involves a learning curve: the T-shaped anastomosis of both internal mammary arteries (6) should not be performed sporadically because, if not performed perfectly, the consequences could be catastrophic, unlike percutaneous coronary intervention, whose complications can usually be managed surgically.

Historically, the use of both internal mammary arteries has been recommended for patients under 60 years of age and in good general health, excluding those with diabetes or obesity. (7) Navia et al. do not appear to make such exceptions and report only a slightly higher incidence of mediastinitis in diabetic patients. The article does not report the measures taken to reduce this complication, such as optimizing perioperative glycemia control or postponing surgery in patients with elevated glycosylated hemoglobin levels.

This article also opens the discussion regarding

Rev Argent Cardiol 2026;94:92-93. https://doi.org/10.7775/rac.v94.i2.21002

SEE RELATED ARTICLE: Rev Argent Cardiol 2026;94:100-111. https://doi.org/10.7775/rac.v94.i2.20988

[1] Cardiac Surgeon. Instituto Nacional del Tórax, Clínica Santa María, Santiago, Chile

the maximum age at which the use of both internal mammary arteries remains advisable compared to the standard approach (left internal mammary artery to the left anterior descending artery and saphenous vein grafts to the remaining coronary arteries). Figure 1 stratifies patients by age using a cut-off point of 65 years and includes a substantial number of patients with 15 years of follow-up. Figures 2 and 3 complement these findings by demonstrating the effect of ventricular dysfunction, obesity and diabetes on survival. Could these findings have been further explored by analyzing interactions between these variables?

In conclusion, the use of bilateral internal mammary artery in OPCAB to revascularize the three coronary affected territories is an excellent option—and probably the best one for most patients— but only when performed by experienced surgical and anesthesiology teams such as those at ICBA. For most cardiac surgeons who have not been trained in this technique, CABG with CPB and cardioplegia remains preferable.

Conflicts of interest
None declared
(See authors conflicts of interest forms on the website).

REFERENCES

1. Navia D, Vrancic M, Piccinini F, Huespe I, Seoane L, Furmento J, y cols. The Gap in the Management of Bicuspid Aortic Valve Disease in Argentina. Rev Argent Cardiol 2026;94:100-11. https://doi.org/10.7775/rac.es.v94.i2.20988
2. Yoo KJ. The Past, Present, and Future of Off-Pump Coronary Artery Bypass Grafting. J Chest Surg 2025;58:121-33. https://doi.org/10.5090/jcs.24.122
3. Naito S, Demal TJ, Sill B, Reichenspurner H, Onorati F, Gatti G, et al. Impact of Surgeon Experience and Center Volume on Outcome After Off-Pump Coronary Artery Bypass Surgery : Results From the European Multicenter Study on Coronary Artery Bypass Grafting (E-CABG) Registry. Heart Lung Circ 2023;32:387-94. https://doi.org/10.1016/j.hlc.2022.11.009
4. Razavi AA, Malas J, Salam A, Emerson DA, Bowdish ME. Off-Pump Coronary Artery Bypass Grafting Is Overutilized. Semin Thorac Cardiovasc Surg 2025;37:43-7. https://doi.org/10.1053/j.semtcvs.2024.12.001
5. Lamy A. The Downfall of the Right Internal Thoracic Artery as a Second Conduit in Coronary Artery Bypass Surgery. Ann Thorac Surg 2025;120:807-10. https://doi.org/10.1016/j.athoracsur.2025.04.020
6. Tector AJ, Amundsen S, Schmahl TM, Kress DC, Peter M. Total revascularization with T grafts. Ann Thorac Surg. 1994;57:33-8. https://doi.org/10.1016/0003-4975(94)90361-1
7. Audisio K, Soletti GJ, Robinson NB, Gaudino M. Multiple Arterial Grafting: For Every Patient and Every Surgeon? Innovations (Phila) 2021;16:214-5. https://doi.org/10.1177/1556984521996333