EDITORIAL

Revascularization in Main Left Coronary Artery Disease: "When Evidence Starts Putting Order in the Real World"

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Even if the truth of facts prevail,
men will always fight in the subtle trench of interpretations.

Gregorio Marañón (1887-1960)

Coronary revascularization surgery (CRS) is considered the best alternative to treat patients with main left coronary artery disease (MLCA). The therapeutic effectiveness and long-term benefits of this treatment have been set since coronary surgery started to develop. (1-3)

The superiority of the surgical therapy over the medical therapy for MLCA disease has been demonstrated in the CASS registry; 1484 patients were followed-up for more than 16 years, and the average survival rate of surgical patients was 13.3, compared to 6.6 years for medically treated patients. (2) Various surgical groups informed their immediate post surgical outcomes for a series of 300 patients with MLCA disease, with a hospital mortality rate of 3% to 4.2%. (4) Ellis et al. reported late mortality figures for 3 years of follow-up ranging from 4% to 40%, and related to the number of associated diseases among the different patients. (5) Recently, improvements in post surgical care, as well as the use of arterial conduits, have spread this therapeutic benefit to patiens with higher preoperative risk. In a recent survey on more than 16.000 patients with MLCA disease, Faxon et al. reported a hospital mortality rate of 2.3%, with a late survival rate of 94%, and a period free of revascularization of 93%. (6)

In our country, the outcomes of MLCA surgery have significantly improved throughout these years. A long way off are the surgical outcomes presented in the CONAREC and ESMUCICA studies; (7, 8) At present, not only has surgical mortality decreased significantly but also, in contrast to these studies, MLCA disease is no more an independent predictor of preoperative risk.

Our experience in treating patients with MLCA disease during the last 6 years is based on 365 patients who underwent surgery with no extracorporeal circulation. The global mortality of the series was 4.1%, and 90% of the patients had no significant complications, with a very low postoperative morbility (auricular fibrillation 11%, AMI 1.9%, reoperation due to bleeding 3%, stroke 1.1%, acute respiratory failure 2.1%), and 85% of the patients were extubated in the operating room.

ARE CRS AND CA EQUIVALENT TREATMENTS TO MLCA DISEASE?

The use of coronary angioplasty (CA) for the MLCA treatment is an interesting alternative, since it is the most proximal anatomic area of coronary circulation, with a wider diameter. However, three anatomic cases limit the success of the CA treatment: 1) only 6% to 9% of the patients have MLCA disease as unique lesion; instead, 70% to 80% of the patients with lesions in MLCA also have multiple vessel disease, and CRS is the therapy that guarantees complete revascularization; 2) in 40% to 94% of the cases, the lesions occur in the distal trunk and/or expand to the coronary arteries with bifurcated or trifurcated lesions; 3) more than half of MLCA lesions have a significant degree of calcification. (9) These cases influence negatively on the CA outcome, and do not influence on the CRS because it is a different revascularization method. The outcomes published in various studies on 1155 patients with MLCA disease and treated with CA show an average hospital mortality rate of 6% and a late mortality (1 to 2 years) of 17% (3% to 31%), with an average need for revascularization of 29% (15% to 34%). (4) The outcomes of seven published studies on 599 patients with MLCA and drug eluting stents (DES) show a significant decrease in hospital mortality rate (2.4%), a reduction in late mortality at 18 months (7%), and a need for revascularization of 13% (2% to 38%). (4) Unfortunately, these studies present significant limitations, such as the inclusion of only few patients in each study, an incomplete angiographic follow-up to quantify the restenosis degree, and a short follow-up period (11 months average) with no control groups, which makes it impossible to discard bias when selecting the procedure. On the contrary, in one of the few published studies with complete angiographic follow-up, Price et al. report a higher restenosis index, 34% in 3 months, and up to 44% in 9

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months. (10) These significant differences in restenosis degree are due to disfavorable outcomes in the distal trunk lesions, with bifurcations and trifurcations, which would constitute prohibitive anatomic scenarios for CA in patients with MLCA lesions. Finally, the outcomes of the SYNTAX (Synergy between PCI with Taxus drug-eluting stent and cardiac surgery) study, recently presented in the 2008 European Congress of Cardiology, show that CA was inferior to CRS in treating multiple coronary artery disease. This randomized study included 1800 patients with lesions in multiple vessels and MLCA disease, treated with CRS and CA. After a year of follow-up, the CA was inferior to the CRS in major cardiovascular and cerebrovascular events (death, myocardial infarction, stroke, or need for a new revascularization, 17.8% *versus* 12.1%). The SYNTAX study also showed that the CRS significantly improved late survival in a one-year follow-up, with 23% of relative benefit in mortality (Figure 1).

Therefore, this study demonstrates that they are not equivalent therapies for groups of complex and high risk patients, and that the CRS is the therapy to choose. This study is more representative of the real world, since no complex and high risk patients have been included in previous communications, probably due to the study design or the selection criteria. Its outcomes are comparable to those in low risk populations. With these new outcomes, it is crucial to inform high risk patients properly about the lower late survival, about the risk of stent thrombosis, and about the need for new reinterventions, before peforming CA with conventional stents or with DES on these patients. While stent thrombosis is not very frequent, it causes complete occlusion of left coronary circulation, which is fatal in 40% of the cases. Conversely, occlusion of coronary bridges usually occur together with angina but not with fatal events, since native circulation is not involved.

Borracci et al. (11) share their experience on 174 surgical patients with MLCA, operated within a four-year period in three facilities, with very good intrahospital morbimortality outcomes. These authors try to perform a long-term analysis of the outcomes, but these outcomes are not very representative due to the short average follow-up period of 4 and 5 years with few risk patients. However, the authors should be recognized for reflecting the early outcomes of coronary surgery in patients with MLCA lesions.

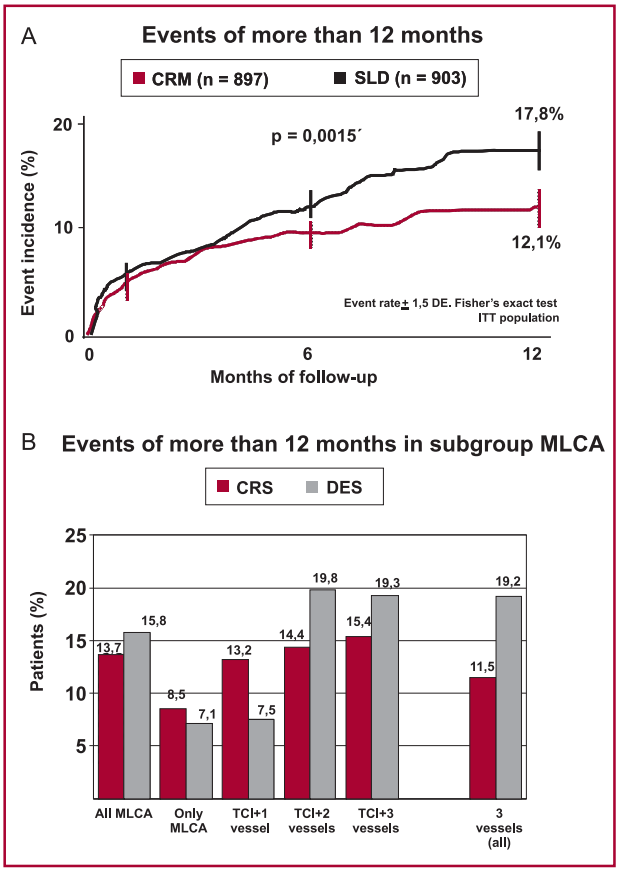

Fig. 1. A. Incidence of major events in one-year follow-up after coronary revascularization. **B.** Incidence of major events in the subgroup of patients with lesions in MLCA and multiple vessel disease. (SYNTAX Study, 2008 European Congress of Cardiology.). MLCA: Main left coronary artery disease. CRS: Coronary revascularization surgery. DES: Drug eluting stents.

BIBLIOGRAPHY

1. Yusuf S, Zucker D, Peduzzi P, Fisher LD, Takaro T, Kennedy JW, Davis K, Killip T, Passamani E, Norris R. *Effect of coronary artery bypass graft surgery on survival: overview of 10-year results from randomized trials by the Coronary Artery Bypass Graft Surgery Trialists Collaboration.* Lancet 1994; 344:563-70.

2. Caracciolo EA, Davis KB, Sopko G, Kaiser GC, Corley SD, Schaff H, Taylor HA, Chaitman BR. *Comparison of surgical and medical group survival in patients with left main equivalent coronary artery disease: long-term CASS experience*. Circulation 1995; 91:2335-44.

3. Eagle KA, Guyton RA, Davidoff R, Edwards FH, Ewy GA, Gardner TJ, Hart JC, Herrmann HC, Hillis DL, Hutter AM Jr, Lytle BW, Marlow RA, Nugent WC, Orszulak TA. *ACC/AHA 2004 guideline update for Coronary artery bypass graft surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines* (Committee to Update the 1999 Guidelines for Coronary Artery Bypass Graft Surgery). Circulation 2004; 110:e340-e437.

4. Taggart DP, Kaul S, Boden W, Ferguson B, Mack M, Guyton R, Sergeant PT, Shemin RJ, Smith PK. *Revascularization for unprotected left main stem coronary artery stenosis*. J Am Coll Cardiol 2008; 51:885-92.

5. Ellis SG, Hill CM, Lytle BW. *Spectrum of surgical risk for left main coronary stenosis.* Am Heart J 1998; 135:335-8.

6. Wu C, Hannan EL, Walford G, Faxon DP. *Utilization and Outcomes of Unprotected Left Main Coronary Artery Stenting and Coronary Artery Bypass Graft Surgery.* Ann Thorac Surg 2008; 86:1153-9.

7. Ciruzzi M, Henquin R, Aranda G, Bozovich G, Heredia P, Rodríguez R, Krauss J, Researchers at CONAREC III project. *Evolución de los pacientes sometidos a cirugía coronaria . Estudio multicéntrico* (Evolution of patients who have undergone coronary surgery. Multicentric study). Rev Argent Cardiol 1996; 64(1):91-100.

8. ESMUCICA Researchers. *Multicentric study of Coronary Surgery. Coronary Patients.* Rev Argent Cardiol 1999; 67(5):605-16.
9. Valgimigli M, Malagutti P, Rodriguez-Granillo GA, et al. *Distal left main coronary disease is a major predictor of outcome in patients undergoing percutaneous interventions in the drug-eluting stent era: an integrated clinical and angiographic analysis based on the RESEARCH and T-SEARCH registries*. J Am Coll Cardiol 2006; 47:1530-7.
10. Price MJ, Cristea E, Sawhney N, et al. *Serial angiographic follow-up of sirolimus-eluting stent for unprotected left main coronary artery revascularization.* J Am Coll Cardiol 2006; 47:871-7.
11. Borracci RA, Rubio M, Milani A, Barrero C, Mauro V, Fairman E et al. *Immediate and 5-Year Outcomes after Surgery in Patients with Left Main Coronary Artery Disease*. Rev Argent Cardiol 2008; 76:437-41.