FIGURE 1. Trial sequential analysis for a relative risk reduction of 25% of postoperative atrial fibrillation after an isolated coronary artery bypass grafting procedure in 7 trials that included 304 patients reporting postoperative atrial fibrillation. Parameters are $\alpha = .05$ (2-sided), $\beta = .20$ (power = 80%), and event frequency in the control group of 33.5%, with odds ratio as measure effects for each study. The cumulated z curve (blue) crosses the trial sequential monitoring boundary (red curve), indicating evidence for a beneficial effect of 25% relative risk reduction provided by the intervention. PUFA, Polyunsaturated fatty acid.

In conclusion, the TSA as we have performed it confirms the results of our previous meta-analysis on the protective effect of preoperative n-3 PUFA supplementation for POAF prevention after an isolated CABG.

Simona Costanzo, MS, PhD
 Augusto Di Castelnuovo, MS, PhD
 Licia Iacoviello, MD, PhD
 Laboratorio di Epidemiologia
 Genetica ed Ambientale
 Laboratori di Ricerca
 Fondazione di Ricerca e Cura
 "Giovanni Paolo II"
 Università Cattolica
 Campobasso, Italy

References

- Costanzo S, di Niro V, Di Castelnuovo A, Gianfagna F, Donati MB, de Gaetano G, et al. Prevention of postoperative atrial fibrillation in open heart surgery patients by preoperative supplementation of n-3 polyunsaturated fatty acids: an updated meta-analysis. *J Thorac Cardiovasc Surg.* April 12, 2013 [Epub ahead of print].
- Mariani J, Doval HC, Nul D, Varini S, Grancelli H, Ferrante D, et al. N-3 polyunsaturated fatty acids to prevent atrial fibrillation: updated systematic

review and meta-analysis of randomized controlled trials. *J Am Heart Assoc.* 2013;2:e005033.

- Messori A, Fadda V, Maratea D, Trippoli S. ω -3 fatty acid supplements for secondary prevention of cardiovascular disease: from "no proof of effectiveness" to "proof of no effectiveness." *JAMA Int Med.* June 17, 2013 [Epub ahead of print].

<http://dx.doi.org/10.1016/j.jtcvs.2013.05.020>

RESPONSE TO STAGED PERCUTANEOUS CORONARY INTERVENTION AND MINIMALLY INVASIVE VALVE SURGERY: RESULTS OF A HYBRID APPROACH TO CONCOMITANT CORONARY AND VALVULAR DISEASE

Reply to the Editor:

We greatly appreciate the insightful comments of Cheema and Roberts¹ concerning our recent article, which evaluated a hybrid approach of staged percutaneous coronary intervention followed by minimally invasive valve surgery (MIVS) in patients with concomitant coronary and valvular

disease.² We concur with their comments that mortality and morbidity rates in valve surgery are highly correlated with the case load of the individual surgeon. At the time our data were gathered, each surgeon on average had more than 20 years of experience and was performing approximately 200 valve cases per year. We therefore do not believe that lack of surgical experience played a role in the outcomes.

Cheema and Roberts¹ were also concerned that 61 of 65 hybrid patients had undergone percutaneous coronary intervention of the left anterior descending coronary artery (LAD) before MIVS, and that only 55.5% of the stents used were drug eluting, contending that perhaps these patients might have been better served with a left internal thoracic artery graft to the LAD. In our study, 25 patients (38.5%) did have bare metal stents placed. These patients were more likely to have single-vessel disease, were older, and did not have a lesion involving the proximal LAD. Thus all the patients with a proximal LAD lesion had drug-eluting stents placed, not bare metal. A meta-analysis of 9 randomized, controlled trials that enrolled 1210 patients with proximal LAD lesions, comparing those who had a left internal thoracic artery graft to the LAD with those with a drug-eluting stent, demonstrated no differences in survival at 30 days, 1 year, or 5 years.³ We therefore believe that the patients in our study were treated appropriately.

Another concern mentioned by Cheema and Roberts¹ was that the mitral valve repair rate in the MIVS group was 58%, and that "perhaps the lack of adequate exposure inherent to a 4- to 5-cm incision compromised the ability to attain a satisfactory repair." Although we agree that in the hands of a high-volume surgeon a P2 prolapse can have a high repair rate, those were not the type of patients we encountered. Our patient population

consisted of a group of patients who tend to have a lower repair rate, including 13 (54.1%) with functional mitral regurgitation, 5 (20.8%) with a rheumatic mitral valve, and only 6 (25%) with myxomatous degeneration of the mitral valve. We would like to clarify that the 58% mitral valve repair rate is much higher than the 41% mitral repair rate reported by Bolling and colleagues⁴ in their review of the Society of Thoracic Surgeons database involving 28,507 patients. We also take issue with the comment that the lack of adequate exposure may compromise the ability to attain a satisfactory repair. The ability to repair the mitral valve is based more on the expertise of the surgeon and the valve pathology than on the surgical approach. Indeed, in a report from the Society of Thoracic Surgeons database of 28,143 patients undergoing primary mitral valve surgery, the mitral valve repair rates are actually higher among patients undergoing MIVS than among those undergoing a median sternotomy (85% vs 67%, respectively; $P < .0001$).⁵ In addition, in a meta-analysis of 5 studies, the proportion of patients with mitral postoperative insufficiency, was not significantly different between those who had MIVS and those who had a median sternotomy (2.4% vs 2%, relative risk, 1.16; 95% confidence interval, 0.38-3.57).⁶ In other words, MIVS does not compromise the repair rate, nor does it reduce the ability to attain a satisfactory repair.

We agree with the final comments of Cheema and Roberts¹ concerning the favorable effects of a concomitant Cox maze procedure during MIVS in patients with a history of atrial fibrillation, although this was not the focus of our study. More important than a Cox maze procedure, however, are the benefits imparted by MIVS in reducing the incidence of postoperative atrial fibrillation. A meta-analysis of 8 studies containing 10,437 patients demonstrated an incidence of atrial fibrillation of 18% among patients undergoing MIVS compared with 22% among those undergoing median sternotomy ($P = .03$).⁶ In our own experience of 571 patients undergoing primary valve surgery, the incidence of postoperative atrial fibrillation among patients undergoing MIVS was 25%, compared with 37% among those undergoing median sternotomy ($P = .002$).⁷

In light of the trends toward increases in MIVS, we hypothesize that there will be an increase in the number of patients treated with a hybrid approach. There are many unanswered questions, however, including the ideal patient for such an approach, the optimal timing between procedures, the optimal management of dual antiplatelet therapy, and the costs. These are answers that only a well-designed and adequately powered randomized, controlled trial can give us.

Orlando Santana, MD^a
Joseph Lamelas, MD^b
^aDivision of Cardiology

Columbia University
Miami Beach, Fla
^bDivision of Cardiac Surgery
Mount Sinai Heart Institute
Miami Beach, Fla

References

1. Cheema FH, Roberts HG Jr. Staged percutaneous coronary intervention and minimally invasive valve surgery: results of a hybrid approach to concomitant coronary and valvular disease. *J Thorac Cardiovasc Surg*. 2013;145:1684.
2. Santana O, Funk M, Zamora C, Escobar E, Lamas GA, Lamelas J. Staged percutaneous coronary intervention and minimally invasive valve surgery: results of a hybrid approach to concomitant coronary and valvular disease. *J Thorac Cardiovasc Surg*. 2012;144:634-9.
3. Kapoor JR, Gienger AL, Ardehali R, Varghese R, Perez MV, Sundaram V, et al. Isolated disease of the proximal left anterior descending artery comparing the effectiveness of percutaneous coronary interventions and coronary artery bypass surgery. *JACC Cardiovasc Interv*. 2008;1:483-91.
4. Bolling SF, Li S, O'Brien SM, Brennan JM, Prager RL, Gammie JS. Predictors of mitral valve repair: clinical and surgeon factors. *Ann Thorac Surg*. 2010;90:1904-11; discussion 1912.
5. Gammie JS, Zhao Y, Peterson ED, O'Brien SM, Rankin S, Griffith BP, J. Maxwell Chamberlain Memorial Paper for adult cardiac surgery. Less-invasive mitral valve operations: trends and outcomes from the society of thoracic surgeons adult cardiac surgery database. *Ann Thorac Surg*. 2010; 90:1401-8. 1410.e1; discussion 1408-10.
6. Cheng D, Martin J, Lal A, Diegeler A, Folliquet TA, Nifong W, et al. Minimally invasive versus conventional open mitral valve surgery: a meta-analysis and systematic review. *Innovations (Phila)*. 2011; 6:84-103.
7. Mihos CG, Santana O, Lamas GA, Lamelas J. Incidence of postoperative atrial fibrillation in patients undergoing minimally invasive versus median sternotomy valve surgery. *J Thorac Cardiovasc Surg*. October 4, 2012 [Epub ahead of print].

<http://dx.doi.org/10.1016/j.jtcvs.2013.05.030>