Reply to the Editor:

We appreciate the comments of Bottio and colleagues on our recent report of intraoperative failure involving 4 bovine pericardial mitral prostheses.¹ The correspondents point out that Carpentier-Edwards Perimount bioprostheses require physiologic pressure to overcome the inherent limited leaflet coaptation that results from no-pressure fixation. They further comment that had the valves in our report been subjected to more physiologic hemodynamics, they might have demonstrated normal function.

To correct any misunderstanding, we would note that 2 of the valve failures were demonstrated after separating from cardiopulmonary bypass with acceptable hemodynamics. At physiologic pressures, there was still massive incompetence, as demonstrated by means of transesophageal echocardiography. The other 2 failed valves were tested before atrial closure. In each of these cases, the degree of insufficiency observed by the surgeons was extremely severe and far greater than that associated with incomplete closure of a pericardial valve at low pressures, a phenomenon with which we are quite familiar.

Paul C. Saunders, MD

Eugene Grossi, MD

Department of Surgery

New York University Medical Center

New York, NY 10016

Reference

1. Saunders PC, Grossi EA, Esposito RA, Bizakis CS, Strong MD, Colvin SB. Failure of four bovine pericardial mitral prostheses. *J Thorac Cardiovasc Surg.* 2004;127:267-8. doi:10.1016/j.jtcvs.2004.04.046

Moderate mitral regurgitation repair at the time of coronary bypass: When is it required?

To the Editor:

We read with great interest the article recently published in the *Journal* by Mallidi and colleagues¹ concerning the debated dilemma of whether to treat mild-to-moderate mitral regurgitation (MR) at the time of coronary artery bypass grafting (CABG).

The authors studied a consecutive series of 163 patients with mild-to-moderate MR

undergoing isolated CABG matched 1:2 with 326 patients without MR undergoing the same operation. Several preoperative variables were considered for matching. Among them, the extent of coronary disease, left ventricular (LV) ejection fraction, functional New York Heart Association class, and recent myocardial infarction were the specific variables. The authors report that patients with MR had poor event-free survival and worse late functional status at follow-up. They conclude that "consideration should be given to repairing moderate MR to improve long-term quality of life."

This is a very interesting topic, about which there is conflicting evidence in the literature. The importance of the cardiac variables chosen by the authors for matching the 2 groups of patients is out of discussion, but in our opinion the increasing attention on LV volume as a prognostic indicator after infarction and CABG should be taken into consideration. LV volume is often unreported in articles concerning CABG in ischemic cardiomyopathy, even if it seems now clear that LV enlargement is far more predictive of postoperative outcome^{2,3} and determines the ultimate prognosis.^{4,5} Yet it cannot be ignored that there is not necessarily correspondence between low EF and LV volumes. The authors report that 44.5% of patients had poor preoperative LV function (<40%); at late follow-up, 20% of patients in the MR group were in New York Heart Association functional class III/IV; and in a subset of 49 patients with echocardiographic late evaluation, one third had worsening of the MR. It would be very interesting to know the preoperative, as well as the late, LV volume in all of these subgroups of patients. Probably a subgroup requiring mitral valve repair would be recognized.

We fully agree with Mallidi and colleagues¹ that at the time of CABG, the "finding of mild to moderate MR should not be treated as an incidental finding but should be further evaluated." We also support that an accurate and complete evaluation is mandatory, but one point should be kept in mind: more important than MR grade itself is the LV morpho-functional status, which should guide the surgical indications and the choice of the best treatment. As Steven Bolling is wont to say: "ischemic mitral regurgita-

tion is a ventricular disease, not a valvular disease."

Pino Fundarò, MD

Paolo Tartara, MD

Ettore Vitali, MD

Ospedale Niguarda Ca'Granda

Dipartimento Cardioracovascolare A. De

Gasperi

Unità Operativa di Cardiocirurgia

Milan, Italy

References

1. Mallidi HR, Pelletier MP, Lamb J, Desai N, Sever J, Christakis GT, et al. Late outcomes in patients with uncorrected mild to moderate mitral regurgitation at the time of isolated coronary artery bypass grafting. *J Thorac Cardiovasc Surg.* 2004;127:636-44.
2. Yamaguchi A, Ino T, Adachi H, Murata S, Kamio H, Okada M, et al. Left ventricular volume predicts postoperative course in patients with ischemic cardiomyopathy. *Ann Thorac Surg.* 1998;65:434-8.
3. Maxey TS, Reece TB, Ellman PI, Butler PD, Kern JA, Tribble CG, et al. Coronary artery bypass with ventricular restoration is superior to coronary artery bypass alone in patients with ischemic cardiomyopathy. *J Thorac Cardiovasc Surg.* 2004;127:428-34.
4. Buckberg GD. Congestive heart failure: treat the disease, not the symptoms—return to normalcy. *J Thorac Cardiovasc Surg.* 2001;121:628-37.
5. Schinkel AFL, Poldermans D, Rizzello V, Vanoverschelde J-LJ, Elhendy A, Boersma E, et al. Why do patients with ischemic cardiomyopathy and a substantial amount of viable myocardium not always recover in function after revascularization? *J Thorac Cardiovasc Surg.* 2004;127:385-90.

doi:10.1016/j.jtcvs.2004.05.032

Reply to the Editor:

We agree with Drs Fundarò, Tartara, and Vitali that ischemic mitral regurgitation (MR) is a disease process with many unanswered questions regarding its ideal treatment. The purpose of our study was to determine the clinical outcomes of patients treated with isolated coronary artery bypass grafting who also had mild-to-moderate MR on a preoperative ventriculogram.¹ When compared with a similar cohort without preoperative MR, our data revealed similar late survival but worse event-free survival and late functional status for those patients with preoperative MR. In those patients with both preoperative and postoperative echocardiograms, approximately one third demonstrated worsening MR. However, ventriculography alone is inadequate to properly assess MR preopera-

tively, and although the issue of left ventricular volume as a predictor of late outcome is intriguing, our data do not allow us to answer this question. Thus further studies are need to be performed to address the important questions of when and how to treat MR in similar patients.

In deciding on the appropriate management of ischemic MR, we believe it is important to address both valve-related factors, such as regurgitant fraction, volume of regurgitation, and pattern of regurgitation, as well as left ventricular factors.² These factors include not only the left ventricular end-diastolic volume but also the presence of any significant left ventricular regional wall-motion abnormalities.³ We also agree with Steven Bolling that "ischemic mitral regurgitation is a ventricular disease." It will be necessary to understand how these factors might change over time, especially when subjected to various medical or surgical treatments, to determine the appropriate point at which one should intervene with these patients. Specifically, is surgical revascularization of the inferior wall sufficient for patients with mild-to-moderate MR? Can preoperative factors, such as myocardial viability and left ventricular volume, help in predicting who will need a repair and who will not? Future studies are clearly needed, especially those investigating the mechanism of ischemic MR, that will hopefully yield useful information with respect to the role of these factors on the outcomes of patients with ischemic MR.

Hari R. Mallidi, MD

Marc P. Pelletier, MD

Department of Cardiac Surgery

University of Toronto

Toronto, Ontario, Canada

References

1. Mallidi HR, Pelletier MP, Lamb J, et al. Late outcomes in patients with uncorrected mild to moderate mitral regurgitation at the time of isolated coronary artery bypass grafting. *J Thorac Cardiovasc Surg.* 2004;127:636-44.
2. Grigioni F, Enriquez-sarano M, Zehr KJ, et al. Ischemic mitral regurgitation. Long-term outcome and prognostic implications with quantitative Doppler assessment. *Circulation.* 2001;103:1759-64.
3. Gillinov AM, Wierup PN, Blackstone EH, et al. Is repair preferable to replacement for ischemic mitral regurgitation? *J Thorac Cardiovasc Surg.* 2001;122:1125-41.
doi:10.1016/j.jtcvs.2004.05.033

Guidelines for coronary revascularization revisited?

A note of caution

To the Editor:

We read with interest the somewhat novel strategy for coronary bypass described by Dr Nežić and associates.¹ The authors suggest that in the case of a localized stenosis in the mid-to-distal left anterior descending (LAD) coronary artery, the lesion can be bypassed with a coronary-coronary graft by using the distal portion of the left internal thoracic artery (LITA), thus reducing the length of conduit used; they also speculate that this attitude might be particularly useful in younger patients to preserve graft material for future reoperations. More specifically, the patient described (41 years old) underwent LAD-LAD grafting by using the free distal LITA segment, LITA-ramus intermedius grafting with the pedicled proximal LITA, and saphenous vein grafting to the posterior descending artery. Although the immediate postoperative angiographic result is neat, we are quite skeptical toward this approach for several reasons.

First, standard LITA-LAD bypass represents a milestone not only in cardiac surgery but also in medicine in general and has clearly been shown to improve survival and reduce the incidence of adverse events after coronary operations.^{2,3} Favor toward bilateral and, more rarely, sequential internal thoracic artery (ITA) grafting, especially to the left coronary system in younger patients, has also increased for similar reasons.⁴

Second, coronary-coronary bypass implies 2 arteriotomies and 2 anastomoses to revascularize the diseased branch. Furthermore, the technique refers to the use of the distal portion of the LITA to construct the graft. Not only the caliber is reduced but also the properties of the distal ITA are different (more muscular and less elastic media).⁵ All these aspects are likely to increase technical hazards of an otherwise standardized procedure. Also, crossclamp and bypass times are increased.

Third, if arteriosclerosis involves the mid-to-distal LAD in a young patient, the disease is by definition aggressive. It is thus incorrect to revascularize the distal LAD depending on its proximal course as an inflow, because disease is likely to progress with time. This is clearly exemplified by the natural history of bypass

grafts to the main course of the right coronary artery, which often becomes diseased, especially at the crux.⁴ In other words anastomoses should ideally be constructed to bypass the most distal lesions. Also, the arteriotomy and manipulation of the LAD proximal to the stenosis might accelerate or promote medial reactivity and thickening in coronary arteries prone to arteriosclerosis, whereas the resistance of the ITA to the development of future stenoses is well known.

Fourth, the unsuitability of the patient for percutaneous coronary angioplasty, as stated by the authors, is questionable. The patient showed multivessel disease, but the presence of an isolated stenosis in the mid-to-distal LAD might make this option appealing, if not preferable, especially for first-time revascularization in younger patients.

In conclusion, although coronary-coronary bypass might at times be useful, we advocate caution toward its application to the LAD. Among the current guidelines for coronary revascularization, the pedicled LITA-LAD graft represents a gold standard, and there must be strong reasons (eg, deep intramyocardial LAD and some ventricular aneurysm resections or reoperations) not to construct this graft in coronary operations.

Marco Pocar, MD, PhD

Andrea Moneta, MD

Francesco Donatelli, MD

Cattedra di Cardiocirurgia

Università degli Studi di Milano

Policlinico MultiMedica

Milan, Italy

References

1. Nežić D, Knežević A, Borović S, Čirković, Milojević P. Coronary-coronary free internal thoracic artery graft on a single, distal, left anterior descending artery lesion. *J Thorac Cardiovasc Surg.* 2004;127:1517-8.
2. Loop FD, Lytle BW, Cosgrove DM, Stewart RW, Goormastic M, Williams GW, et al. Influence of the internal-mammary-artery graft on 10-year survival and other cardiac events. *N Engl J Med.* 1986;314:1-6.
3. Eagle KA, Guyton RA, Davidoff R, Ewy GA, Fonger J, Gardner TJ, et al. ACC/AHA guidelines for coronary artery bypass graft surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Revise the 1991 Guidelines for Coronary Artery Bypass Graft Surgery). *J Am Coll Cardiol.* 1999;34:1262-347.
4. Taggart DP, D'Amico R, Altman DG. Effect of arterial revascularisation on survival: a