long-term survival of cardiac surgical patients.

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<http://dx.doi.org/10.1016/j.jtcvs.2012.08.077>

Reply to the Editor:

We read with interest the letter by Kramer and colleagues regarding our recent article exploring the association between the timing of cardiac catheterization and the incidence of postoperative acute kidney injury (AKI) after elective proximal aortic surgery.¹ Our study is noteworthy in that it failed to identify an increased incidence of AKI among patients undergoing catheterization within 1 to 3 days of surgery when compared with patients undergoing catheterization 4 or more days before surgery. This finding seemingly contradicts

a study by Kramer and colleagues,² which found that catheterization during the same admission as coronary artery bypass grafting or valve surgery was associated with an increased incidence of AKI relative to catheterization during a previous admission. Kramer and colleagues now assert that our findings should be read with caution because of the presence of variability between patient groups in our study.

As outlined in our discussion, there are many other reasons why our results may differ from the findings of the study of Kramer and colleagues.² First, the proximal aortic surgical patients in our study were younger, healthier, and at a lower baseline risk of development of contrast-induced nephropathy than the coronary artery bypass grafting and valve surgical patients included in the study of Kramer and colleagues.² Second, same-day catheterizations, which have been associated with the highest risk of postoperative AKI in some previous studies,^{1,3,4} were not performed at our institution. Most importantly, our study was restricted to patients undergoing elective surgery, and all emergency and urgent procedures were excluded. In the study of Kramer and colleagues,² patients requiring urgent operation were included in the analysis and comprised 87% of the same-admission catheterization group, compared with only 14% of the previous-admission catheterization group. As a result, patients undergoing catheterization during the same admission as surgery were 25 times more likely to have had a preoperative myocardial infarction, had a higher incidence of 3-vessel coronary artery disease, had lower ejection fractions, had a higher incidence of preoperative balloon pump use, and had longer cardiopulmonary bypass times. Thus Kramer and colleagues² essentially compared elective patients who underwent catheterization on a previous admission with urgent patients who underwent catheterization

during the same admission as surgery. Not surprisingly, the urgent patients had worse outcomes, including more AKI. Thus although our study does contain some important differences between patient groups that should be considered by the reader, the restriction of our study to patients undergoing elective operations led to comparatively less selection bias and variability than in the study of Kramer and colleagues.²

We echo the sentiments of Kramer and colleagues in calling for additional studies to delineate better the ideal time frame between catheterization and cardiac surgery. The Society of Thoracic Surgeons database may provide the best opportunity to study this question by interrogating a multi-institutional clinical database that allows comprehensive risk-adjustment for case status as well as the multiple other patient and perioperative factors that contribute to AKI. The study could further be designed to assess the association between the timing of catheterization and the incidence of postoperative AKI among various subsets of the cardiac surgical population, including those undergoing coronary artery bypass grafting, valve operations, and proximal aortic surgery.

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<http://dx.doi.org/10.1016/j.jtcvs.2012.09.077>

EXTENSIVE LEFT ANTERIOR DESCENDING ARTERY ENDARTERECTOMY AND RECONSTRUCTION

To the Editor:

We congratulate Myers and colleagues¹ for their recent article regarding extensive endarterectomy and reconstruction of the left anterior descending coronary artery (LAD). Our group² previously reported the technique of using the internal thoracic artery (ITA) as an onlay patch after an extensive LAD endarterectomy, and we consistently use this technique whenever we encounter diffuse LAD disease that cannot be treated by conventional revascularization techniques. In cases where the left ITA is not adequate because of the extent of the endarterectomy, we use a saphenous vein onlay patch over the endarterectomized vessel and then graft the left ITA onto the hood of the vein patch.

Of 1571 patients undergoing coronary endarterectomy, 368 patients underwent endarterectomy of the LAD (23.4%). Of these, 212 patients received a left ITA graft: 184 patients with a left ITA onlay patch and 28 with the left ITA anastomosed onto the hood of a saphenous vein onlay patch. We have had excellent results with both of these techniques. Among the 89 patients who underwent angiography, the LAD was patent in 81%.

We have used another option in patients with diffuse coronary artery disease and small vessels. Twenty-four patients underwent transmyocardial laser revascularization with a high-energy carbon dioxide laser³ in addition to bypass grafting and

endarterectomy of the LAD. They received 8 to 24 channels, with a mean of 10.8 channels per patient. We have found transmyocardial laser revascularization to be a useful adjunct to bypass grafting and endarterectomy in patients with diffuse and small vessel disease,^{4,5} with an 80% reduction in angina. Of late, in addition to extensive endarterectomy and left ITA onlay patch, 3 patients have received stem cell implants on either side of the LAD segment that was grafted.

We commend Myers and colleagues¹ for their results, and we take this opportunity to emphasize the option of endarterectomy for tackling diffuse coronary artery disease.

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<http://dx.doi.org/10.1016/j.jtcvs.2012.09.082>

Reply to the Editor:

We thank Keshavamurthy and colleagues for their positive and interesting comments on our report on extensive endarterectomy and reconstruction of the left anterior descending coronary artery.¹ We are aware of their earlier study,² which provided excellent angiographic data (81% patent left anterior descending coronary artery in 89 patients) in a subset of their extensive patient population.

We also thank Kato and colleagues for their comments on our report and for providing us with the opportunity to address key issues relevant to the understanding of this technique. We are aware of their recent publication.³ Unlike our study, only 33% of their patients required an endarterectomy. We therefore think that their patient population is totally different from ours, which explains the better 10-year survival. We nonetheless congratulate them on their excellent results, and we agree that identifying the causes of death will enhance our knowledge about this complex group of patients. Unfortunately, we do not have the data on the specific causes of death, but rather only all-cause mortality, as provided by the Social Security Death Index.

Regarding the use of a saphenous vein patch, this technique was only used in select patients, as outlined in our article,² in whom the endarterectomy required a long arteriotomy to complete the extraction of the atherosclerotic core. In these patients, we were concerned about the length of the left internal thoracic artery (ITA) pedicled graft, and we instead chose to use a vein patch onto which a left ITA was grafted. Although venous graft disease and the superiority of standard left ITA–left anterior descending coronary artery anastomosis are well documented, there are relatively few data on the fate of vein patches used in conjunction with left ITA grafts. We believe that a pedicled ITA graft has the ability to