IMPACT OF MULTIPLE GRAFTS TO EACH MYOCARDIAL TERRITORY ON LONG-TERM SURVIVAL

To the Editor:

We read with great interest the recent article by Chu and colleagues¹ examining the impact of multiple grafts to each myocardial territory on long-term survival after coronary artery bypass grafting. We think, however, that a number of points need to be clarified before their conclusions that multiple grafts to each myocardial territory do not confer survival benefit can be supported.

The first point is in relation to the difference between the groups with respect to the total number of grafts used. It appears that the difference between the two groups was 0.8 vein grafts. The number of internal thoracic arteries (ITAs) used was the same at 0.9 (presumably the left ITA in most cases), and no comment was made about the use of the radial artery or the right ITA. Consequently, we would not expect any difference in long-term survival between the two groups.

Second, there is no information about which territories received the multiple grafts. If most of the patients received multiple grafts only in the left anterior descending arterial territory (that is, had diagonal arteries grafted), again we would not expect any difference in long-term survival. Indeed, Sergeant and coworkers² demonstrated no additional benefits of

multiple arterial grafts in the left anterior descending arterial territory in terms of a reduction in perioperative or postoperative myocardial infarction.

Third, the survival curve is probably only meaningful up to 6 years, because after that the number of patients at risk was small. It is likely that much longer follow-up is required before any real differences in survival could be detected. Lytle and colleagues³ have demonstrated that even when bilateral ITAs are used, a survival advantage relative to a single ITA becomes evident only during the second postoperative decade, and the magnitude of that benefit increases through to 20 postoperative years.

Overall, we think that if patients in the group with multiple grafts to each myocardial territory had received grafts to territories other than the left anterior descending arterial territory, if radial artery or right ITA grafts had been used more extensively, and if the patients had been followed up for longer, such as for more than 10 years, differences in long-term survival might have been observed.

Finally, although data on long-term survival are clearly important, perhaps even more relevant are data on return of angina symptoms and repeated interventions, either percutaneous or surgical. We are interested in the comments of the authors.

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Reply to the Editor:

We thank Akowuah and colleagues for their interest regarding our article¹ and appreciate the opportunity to reply.

The mean difference in the number of vein grafts between the two groups of patients was indeed 0.8, and the number of internal thoracic artery grafts was the same in both groups. It is certainly possible that our study committed a type II statistical error in that we were not able to detect small differences in long-term survival between the groups. Nevertheless, as we mentioned in article,¹ our study was designed to detect a long-term survival difference of at least 8% between the groups. We agree with Akowuah and colleagues that for an actual long-term survival benefit of less than 8% for patients with multiple grafts to each diseased myocardial territory, we would not have been able to detect the difference with our study design. The Veterans Affairs Continuous Improvement in Cardiac Surgery Program database does not have specific anatomic information on the use of radial artery or right internal thoracic artery as grafts.

We did not perform a subgroup analysis on patients according to which specific myocardial territory received multiple grafts. Such a subgroup analysis would be better suited to a much larger sample of patients, which would have enough power to detect a true difference in long-term survival benefit. In a retrospective study involving 9600 patients, Sergeant and colleagues² concluded that the use of multiple arterial grafts in general confers no additional benefit in the reduction of perioperative infarcts. Their study did not specifically address the impact

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of multiple arterial grafts on various myocardial territories. Vander Salm and colleagues³ analyzed data from the Bypass Angioplasty Revascularization Investigation trial and concluded that construction of multiple grafts to myocardial territories other than that of the left anterior descending coronary artery appears to confer no long-term advantage.

We agree with Akowuah and colleagues that the number of patients at risk beyond 6 years was relatively small. In our study, we considered 20 to be the minimum number of patients at risk to confirm meaningful clinical implications. As previously mentioned, it is certainly possible that in our study we committed a type II statistical error, and that long-term survival difference less than 8% would not be detectable with our study design. A longer follow-up period, a larger sample population, or both, as Akowuah and colleagues suggested, might be able to detect a difference in long-term survival benefit. Should such a survival benefit actually exist, however, it is likely to be small.

Return of angina symptoms and repeated coronary interventions, as suggested by Akowuah and colleagues, are well-known surrogate markers of poor surgical myocardial revascularization outcome. Such data are beyond the scope of our database, and this is certainly an area that we are interested in investigating in future studies. We appreciate Akowuah and colleagues for bringing this to our attention, and we are planning a follow-up study to address these issues.

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CORONARY BLOOD SUPPLY OF THE INFERIOR WALL OF THE RIGHT VENTRICLE IN HEARTS WITH EBSTEIN MALFORMATION: RELEVANCE TO VERTICAL PPLICATION

To the Editor:

We read with considerable interest the study of Adachi and colleagues¹ entitled "Coronary blood supply of the inferior wall of the right ventricle in hearts with Ebstein malformation:

relevance to ventricular plication." The anatomic study is very informative for surgeons involved in Ebstein anomaly surgery.

There is a debate about the indication and technique of plication of the atrialized right ventricle. The authors are totally right when emphasizing the risk of coronary artery injury during plication. However, their Figure 2 did not reflect the anatomic reality for 2 reasons.

First, the posterior descending coronary artery is not in the ventricular wall but outside of the heart in the epicardial fat. The situation of this artery, as mentioned in the study, could be in the ventricular groove or deviated to the atrialized right ventricle or the left ventricle.

Second, wherever the posterior descending artery is located, the risk of direct injury is minimal with pure endocardial sutures. This is well demonstrated in the operative video of MMTS.²

The plication of the posterior part of the atrialized right ventricle, as we

FIGURE 1. Plication of the atrialized right ventricle. *Site of the suture. A, Before plication. B, After plication. RV, Right ventricle; LV, left ventricle.