there was significantly greater blood loss in the OPCAB group, which contradicts most other published OPCAB articles.¹ Recently, it was noted that during OPCAB an ACT longer than 350 seconds is associated with a significantly higher rate of postoperative myocardial infarction.³ It is presumed that at a longer ACT there may be platelet activation leading to a detrimental effect,³ very similar to the situation with percutaneous coronary intervention, in which a longer ACT is always avoided for the same reason. Physiology during OPCAB is similar to that during percutaneous coronary intervention rather than to that during conventional CABG. Longer ACT may lead to postoperative myocardial infarction. It is time for OPCAB surgeons to look again at the anticoagulant strategy. As an OPCAB surgeon, my assumption is that a longer ACT may have had a detrimental effect on non-ITA grafts, and such an effect may explain the findings of the Danish On-pump Versus Off-pump Randomization Study (DOORS) study, including the greater blood loss with OPCAB.¹ An added advantage of maintaining a lower ACT during OPCAB is lesser blood loss.³

In the long-term survival study of Kim and colleagues,⁴ significantly higher incidences of diabetes and hypertension in the OPCAB group may have contributed to a higher long-term all-cause mortality, rather than inferior graft patency of OPCAB per se. It is interesting to note that in that study⁴ 2 operators (operators C and D) were associated with higher long-term mortalities after OPCAB, and they performed more conventional CABG than OPCAB procedures. The lesser number of grafts in OPCAB is also indicative of inadequate operator experience. Operator experience is an important determinant of OPCAB result.

I congratulate Smith for a nicely analytic editorial on the topic. My own limited experience has proved

that with an intra-aortic balloon pump as a bailout, it is possible to perform OPCAB without any conversion, and complete revascularization can be easily performed.⁵ My colleagues and I compete with the cardiologists, aggressively pursuing multivessel percutaneous coronary intervention, and offer anaortic OPCAB with bilateral ITA grafts as a better alternative in terms of graft patency.

It is very reassuring for us to see equal patency rate of OPCAB and conventional CABG ITA grafts in the DOORS study.¹ It is probably longer ACT, venous grafts, or other technical factors (length of the graft, native coronary artery stenosis)—and to some extent operator factors—that may have resulted in occlusion of the non ITA grafts. We probably need an OPCAB study specifically comparing longer and shorter ACTs to arrive at a definitive conclusion. I would say that the OPCAB party has just begun. It is too early to call off the party!

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References

1. Houliind K, Fenger-Grøn M, Holme SJ, Kjeldsen BJ, Madsen SN, Rasmussen BS, et al; for the DOORS Study Group. Graft patency after off-pump coronary artery bypass surgery is inferior even with identical heparinization protocols: results from the Danish On-pump Versus Off-pump Randomization Study (DOORS). *J Thorac Cardiovasc Surg*. 2014;148:1812-9.e2.
2. Smith CR. #SLOPCAB: is the party over? *J Thorac Cardiovasc Surg*. 2014;148:1788-9.
3. Song Y, Song JW, Shim JK, Kwak YL. Optimal anticoagulation during off pump coronary artery bypass in patients recently exposed to clopidogrel. *Yonsei Med J*. 2013;54:1119-26.
4. Kim JB, Yun SC, Lim JW, Hwang SK, Jung SH, Song H, et al. Long-term survival following coronary artery bypass grafting: off-pump versus on-pump strategies. *J Am Coll Cardiol*. 2014;63:2280-8.
5. Saha KK, Kaushal RP, Kumar A, Deval M, Saha KK, Kaul SK. Intraaortic balloon pump boon for off-pump coronary artery bypass grafting. *Asian Cardiovasc Thorac Ann*. July 22, 2014 [Epub ahead of print].

<http://dx.doi.org/10.1016/j.jtcvs.2014.11.086>

DEFINITION OF PROXIMAL ANASTOMOSIS IN THE DOORS STUDY Reply to the Editor:

We thank Smith¹ and Saha² for their comments in response to our article regarding graft patency in the Danish On-pump Versus Off-pump Randomization Study.³ They have noted that a high proportion of the graft obstructions were found at the proximal anastomoses, which they believe should not be influenced by the use of cardiopulmonary bypass.

We see 2 possible explanations for this finding. One has to do with the definition of “proximal anastomosis” applied in the study. For some grafts, the definition is simple. For a single aortocoronary graft, the proximal anastomosis is placed on the aorta, and pedicled thoracic artery grafts do not have proximal anastomoses. For other types of grafts, however, definitions are more complicated. In the case of a Y-graft, we defined the end-to-side anastomosis on the pedicled internal thoracic artery as the proximal anastomosis of the nonpedicled graft. In the case of a jump graft, we defined the outflow from a side-to-side anastomosis to be the proximal anastomosis of the part of the downstream graft (Figure 1). This definition was chosen because a stenosis at this site will affect the inflow to the graft in the same manner as would a stenosis in the proximal anastomosis of an aortocoronary single graft. According to this definition, the technical challenges with performing the proximal anastomosis of a distal jump graft are similar to those that apply to performing the distal anastomosis. Fifty of the obstructed proximal anastomoses in the study were of this kind.

The other difficulty in interpreting the data is the fact that an occlusion of a distal anastomosis will often result in thrombosis of the entire graft. In that case it is not possible to inject contrast at the site of the proximal anastomosis, which is therefore deemed to be

FIGURE 1. Definitions of stenoses of proximal and distal anastomoses in a jump graft. Arrows indicate the direction of blood flow. A, Jump anastomosis with a stenosis in the proximal part, constituting a stenosis of the distal anastomosis of graft a. B, Jump anastomosis with a stenosis in the distal part, constituting a stenosis of the proximal anastomosis of graft b.

closed. Unless retrograde flow into the distal part of the graft can be observed when injecting contrast into another graft or native coronary artery, it is not possible to visualize the distal anastomosis. As we reported in our article,³ this was the case in a high proportion of the grafts with obstructed proximal anastomoses, possibly causing a number of grafts to be defined as occlusions of the proximal anastomosis even if the problem causing the graft failure was originally located at the distal end. We believe that this clarification confirms the conclusion from the original article that graft patency after off-pump surgery is inferior.³

We agree with Saha² in not recommending the future use of full heparinization for off-pump surgery because the higher risk of bleeding was not balanced by better graft patency. Whether it is time to call off the off-pump coronary artery bypass grafting party is probably not so clear. Despite inferior graft patency, in the Danish On-pump Versus Off-pump Randomization Study we found no difference between the groups in survival or in quality of life after 6 months,⁴ a trend toward fewer strokes in the off-pump group, and better cost-effectiveness in the off-pump group.⁵ Long-term follow-up may provide a better basis for decision.

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References

1. Smith CR. #SLOPCAB: Is the party over? *J Thorac Cardiovasc Surg.* 2014;148:1788-9.
2. Saha KK. High activated clotting time, or vein graft, or off-pump coronary artery bypass grafting? Too early to call off the party! *J Thorac Cardiovasc Surg.* 2015;149:943-4.
3. Houliind K, Fenger-Grøn M, Holme SJ, Kjeldsen BJ, Madsen SN, Rasmussen BS, et al; DOORS Study Group. Graft patency after off-pump coronary artery bypass surgery is inferior even with identical heparinization protocols: results from the Danish On-pump Versus Off-pump Randomization Study (DOORS). *J Thorac Cardiovasc Surg.* 2014;148:1812-9.e2.
4. Houliind K, Kjeldsen BJ, Madsen SN, Rasmussen BS, Holme SJ, Nielsen PH, et al; DOORS Study Group. On-pump versus off-pump coronary artery bypass surgery in elderly patients: results from the Danish On-pump Versus Off-pump Randomization Study. *Circulation.* 2012;125:2431-9.
5. Houliind K, Kjeldsen BJ, Madsen SN, Rasmussen BS, Holme SJ, Pallesen PA, et al; DOORS Study Group. OPCAB surgery is cost-effective for elderly patients. *Scand Cardiovasc J.* 2013;47:185-92.

<http://dx.doi.org/10.1016/j.jtcvs.2014.11.086>

THORACIC AORTIC SURGERY IN EUROPE: DOES VOLUME MEAN NECESSARILY QUALITY?

To the Editor:

We read with great interest the report by Ariyaratnam and colleagues¹ regarding their experience with

emergency and elective thoracic aortic surgery during the last 12 years. Ariyaratnam and colleagues¹ reported in-hospital mortality figures of 23.7% and 12.8% in their dissection and nondissection groups, respectively, and concluded that regional centers do not have outcomes comparable to those of the supercenters that exist in the United States.

Certainly, the standard of care for the management of thoracic aortic disease (TAD) is a relevant topic. Recent guidelines have identified significant knowledge gaps with respect to the appropriate management and configuration of clinical services for aortic disease.^{2,3} These gaps result in high variability in the management of these patients, and presumably in variation in the quality of care and outcomes. On the one hand, in-hospital mortality appears to be strongly associated with both surgeon and hospital volumes; on the other hand, the correct operative management of patients with TAD is another factor that affects their hospitalization outcomes.²⁻⁴

In the series of Ariyaratnam and colleagues,¹ we noticed unusually high rates of intra-aortic balloon pump use in both the dissection (46%) and nondissection (50%) groups, despite low rates of poor preoperative ejection fraction (2.6% and 2.9%, respectively). The use of an intra-aortic balloon pump in patients with TAD, fragile tissues, and peripheral vascular disease could partially explain the hospitalization outcomes presented in the article of Ariyaratnam and colleagues.¹ As a matter of fact, peripheral vascular disease and hypertension were independent predictors for in-hospital mortality (odds ratios of 14.428 and 9.325, respectively), especially in the dissection group, possibly reflecting the negative effects of intra-aortic balloon pumps on these patients. In addition, Ariyaratnam and colleagues¹ adopted central cannulation or femoral artery cannulation for all patients,