Surprises happen all the time

Frank W. Sellke, MD

From the Karl Karlon & Gloria Karlon Professor of Cardiothoracic Surgery, Division of Cardiothoracic Surgery, Alpert Medical School of Brown University, Providence, RI.

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Address for reprints: Frank W. Sellke, MD, Rhode Island Hospital, MOC 360, 2 Dudley St, Providence, RI 02905 (E-mail: fsellke@lifespan.org).

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Central Message

Saphenous vein graft patency after CABG has been reported to be similar in patients with and without diabetes. When one examines the literature and considers reasons, the finding are not surprising.

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The expert review by Kurlansky¹ in this issue of the *Journal* examines the paper by Raza and colleagues² at the Cleveland Clinic on their report on the “Influence of Diabetes on Long-Term Coronary Artery Bypass Graft Patency,” published in the *Journal of the American College of Cardiology*. It is no surprise that the patency of internal thoracic artery (ITA) grafts declined only slightly over 20 years, whereas saphenous vein graft patency declined to 57% and 42% in patients with diabetes and 58% and 41% in patients without diabetes, at 10 and 20 years, respectively. After adjustment for potentially confounding risk factors, diabetes was actually associated with a slightly but statistically significant greater 1-year ITA patency but similar patency at up to 20 years. The difference in early ITA patency is slight and of questionable clinical significance. What was surprising is that both early and late patency of saphenous vein grafts was similar between patients with and without diabetes. I agree that it is surprising that the vein graft patency is the same in patients with and without diabetes. Personally, I find it less surprising than the discovery of gravitational waves but more surprising than a former member of the *Saturday Night Live* cast being forced to resign from the Senate. However, when one reviews the literature, there are other reports of little effect of the diabetic state on vein graft patency.³⁻⁵

What are the potential causes for this lack of effect of diabetes? First, in the study by Raza and colleagues,² only a small subgroup of patients underwent coronary angiography. Because it is more likely that patients will undergo angiography after coronary artery bypass grafting (CABG) if they experience recurrent angina or graft failure, this may affect the reported patency of vein grafts versus the actual patency. Second, patients undergoing CABG may have a marked improvement in medical management after CABG, including glucose control. Many of our patients who undergo CABG present with an A1C of 8 or greater but have no idea that they have diabetes. This may lessen the effect of diabetes on cell signaling, the development of atherosclerosis, and, hence, vein graft patency. It has been reported that coronary microvascular reactivity and

permeability are markedly abnormal in poorly controlled diabetes but similar to that observed in normal patients when diabetes is well controlled (ie, A1C <7).⁶⁻⁸ Although macrovascular arterial disease is less responsive to glucose control than is microvascular disease in the setting of diabetes, processes leading to vein graft disease after CABG may not resemble those responsible for large arterial disease before or after CABG.

Kurlansky feels that it is puzzling that there was an independent association of diabetes with mortality even after taking into account for associated morbidity, despite an absence of difference in graft patency. However, diabetes is associated with clinical and subclinical vascular disease, an increased incidence of malignant disease, and other potentially fatal illnesses. Thus, although it seems surprising that saphenous vein graft patency is similar in patients with and without diabetes, when one examines the literature, and considers the possible reasons, the results are not all that surprising.

References

1. Kurlansky P. Graft patency in diabetic patients and the discomfort of thought. *J Thorac Cardiovasc Surg*. 2018;155:2316-21.
2. Raza S, Blackstone EH, Houghtaling PL, Rajeswaran J, Riaz H, Bakaeen FG, et al. Influence of diabetes on long-term coronary artery bypass graft patency. *J Am Coll Cardiol*. 2017;70:515-24.
3. Van der Meer J, Hillege H, van Gilst W, de la Riviere AB, Dunselman PH, Fidler V, et al. Coronary bypass surgery: a comparison of internal mammary artery and saphenous vein grafts after coronary artery bypass surgery: no difference in 1-year occlusion rates and clinical outcome. *Circulation*. 1994;90:2367-74.
4. Hoogwerf BJ, Waness A, Cressman M, Canner J, Campeau L, Domanski M, et al. Effects of aggressive cholesterol lowering and low-dose anticoagulation on

- clinical and angiographic outcomes in patients with diabetes. *Diabetes*. 1999;48:1289-94.
5. Schwartz L, Kip KE, Frye RL, Alderman EL, Schaff HV, Detre KM. Coronary bypass graft patency in patients with diabetes in the Bypass Angioplasty Revascularization Investigation (BARI). *Circulation*. 2002;106:2652-8.
 6. Feng J, Liu Y, Sabe AA, Sadek AA, Singh AK, Sodha NR, et al. Differential impairment of adherens-junction expression/phosphorylation after cardioplegia in diabetic versus non-diabetic patients. *Eur J Cardiothorac Surg*. 2016;49:937-43.
 7. Feng J, Liu Y, Dobrilovic N, Chu LM, Bianchi C, Singh AK, et al. Altered apoptosis-related signaling after cardioplegic arrest in patients with uncontrolled type 2 diabetes mellitus. *Circulation*. 2013;128(11 suppl 1):S144-51.
 8. Emani S, Ramlawi B, Sodha NR, Li J, Bianchi C, Sellke FW. Increased vascular permeability after cardiopulmonary bypass in patients with diabetes is associated with increased expression of vascular endothelial growth factor and hepatocyte growth factor. *J Thorac Cardiovasc Surg*. 2009;138:185-91.