Dr Laudito. We have also to stop to be politically correct saying that a BIMA operation is not the usual coronary operation, occurred more times, more clinical experience, more surgical experience. It is not the usual CABG. So we need to have the appreciation and the time for that.

Thank you.

Dr Raza. Thank you for your comments.

Dr Saswata Deb (*Toronto, Ontario, Canada*). A very nice talk. High-grade target vessel stenosis is an important issue for radials. Did you consider that for mammary arteries, especially the right?

Dr Raza. Nearly 1200 patients in our data set underwent radial artery grafting. However, it was not within the scope of this project to specifically consider the outcomes of patients undergoing radial

artery grafting or the issue of high-grade target vessel stenosis. Our usual practice is to use radial artery grafts to fill in the left-sided gaps. A radial graft can go to the right coronary artery, but only if it is totally occluded or the stenosis is $>90\%$.

Dr Deb. My question was more for the right ITA. High-grade stenosis, was that factor considered for where the right ITA was going to be placed?

Dr Raza. Regarding right ITA grafting, we believe that it should go to the second most important coronary artery, which is usually the circumflex. Competitive flow, which you are getting at, becomes more of an issue when we graft the vessel to the right coronary artery. Thus, if we use the right ITA to graft the right coronary artery, we would first have determined whether it is totally occluded or critically stenosed, that is, $>90\%$.

EDITORIAL COMMENTARY

Two internal thoracic arteries really are better

Andrea J. Carpenter, MD, PhD

The research reported by Raza and colleagues presents compelling evidence that best outcomes of surgical revascularization in persons with diabetes are achieved with the use of bilateral internal thoracic artery grafts and complete revascularization with only modest increase in deep sternal wound infection. It is time for greater adoption of bilateral internal thoracic artery grafting across coronary surgery centers.

Raza and colleagues¹ are to be congratulated on an elegant review of operative strategies that may improve or hinder outcomes of coronary revascularization in patients with diabetes. Mining the extensive outcomes database maintained at the Cleveland Clinic, they identified the optimal strategy for long-term survival among patients with diabetes to include use of bilateral internal thoracic arteries (BITAs) and achievement of complete revascularization. In their cohort with diabetes only 2 complications occurred more frequently with the use of BITA: reoperation for bleeding and deep sternal wound infection (DSWI).

Almost all practicing cardiac surgeons believe that completeness of revascularization is important to good outcomes. However, the adoption of BITA use has been extremely slow, with surgeons avoiding BITA in the presence of diabetes, obesity, and chronic obstructive pulmonary disease because of concern regarding DSWI. This opinion persists in our culture despite a wealth of literature supporting the benefit of BITA on survival, symptom relief, and diminished repeat revascularization.

Although Dr Sabik has long been a proponent of BITA for coronary grafting, there were only 938 cases (8%) using BITA in this cohort of 11,922 patients with diabetes.¹ The rate of DSWI was statistically elevated compared with patients receiving a single internal thoracic artery graft, but the influence of DSWI on survival was small. Evaluating patient factors associated with DSWI revealed that women with body mass index > 30 , peripheral artery disease, prior myocardial infarction, and pharmacologic therapy for diabetes were at highest risk. Men, nonobese women, and all patients with diet-controlled diabetes had very modest increased risk.

Acknowledging that the report by Raza and colleagues is a retrospective review and that the total number of patients having BITA was only 8% of the cohort,¹ these data still provide compelling evidence that the risk of excess DSWI with BITA grafting is small. Although the adverse effects of DSWI can be severe, the overall long-term survival is still better with BITA.

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In the modern era of coronary revascularization it is clear that surgical revascularization is the method of choice for patients with diabetes. This study adds to the literature supporting marked benefit of BITA grafting in patients with diabetes, and adds some measure of caution for obese women with extensive atherosclerotic burden and need for pharmacologic treatment of their diabetes. It is long since

time for greater adoption of BITA grafting in all our practices.

Reference

1. Raza S, Sabik JF III, Masabni K, Ainkaran P, Lytle BW, Blackstone EH. Surgical revascularization techniques that minimize surgical risk and maximize late survival after coronary artery bypass grafting in patients with diabetes mellitus. *J Thorac Cardiovasc Surg.* 2014;148:1257-66.