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Commentary: Protect, prevent, prolong...

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The choice of the best revascularization procedure in stable ischemic heart disease is challenging and remains controversial.¹ It requires an individual approach, taking into consideration factors such as patient comorbidities, morphology of coronary arteries, coronary disease involvement pattern, as well as technical feasibility and risks associated with each treatment modality, ie, percutaneous coronary intervention (PCI) and coronary artery bypass grafting (CABG).²

In this paper, the authors hypothesize that the survival benefit of CABG over PCI therapy in stable ischemic heart disease is mediated by a mechanism that is not solely associated with revascularization itself but rather with distal coronary artery surgical collateralization.³ While PCI focuses on treating flow-limiting lesions, CABG allows for flow distal to the stenotic vessel not only by improving the flow to the subtended coronary vascular bed but also by creating an alternate blood flow pathway. In their previous review, the authors illustrated this concept of surgical collateralization by linking it to the superiority of CABG over PCI in preventing myocardial infarction and prolonging life.⁴ Although this link has not demonstratively been established, the current review is a sequel on the topic, urging cardiac surgeons to enable necessary adjustments to their daily practice to satisfy this concept. In the authors' view, espousing that a survival benefit in stable ischemic heart disease is directly associated with the infarct-prevention attributes of surgical collateralization is a necessary first step in implementing changes to our surgical practice. In 6 key points, the authors highlight their proposed

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CENTRAL MESSAGE

Surgical collateralization is the long-held and recently refined concept by which bypass grafts protect the distal coronary vascular bed and prevent myocardial infarction, with ensuing survival benefit.

prerequisites to this principle, from changes in the terminology of patient consent, moving onto an absolute need for graft patency, the role of complimentary medical therapy, and a refined assessment of coronary artery disease including the evaluation of competitive flow potential.

Several of the concepts presented remain hypothetical, but one of the crucial aspects emerging from the proposed mechanism of surgical collateralization is an optimal way to ensure graft patency.^{5,6} While the choice of grafts directly relates to graft patency, careful target selection using a combination of invasive and noninvasive assessment tools are also proposed by the authors as a way to prevent myocardial infarction and warrant survival benefit.⁷ It is important, however, to realize that this causal link remains unproven in patients undergoing CABG. For instance, we believe that to optimize the results of surgical therapies for stable ischemic heart disease, its combination with optimal guideline-mediated medical therapy may be as crucial as graft patency per se in complementing the effect of surgical collateralization.⁸

Taken to the extreme, it is possible, however, that the proposed effects of surgical collateralization may be amplified in patients with reduced left ventricular ejection fraction, where the inability of PCI to fully protect against restenosis or new lesions could be particularly deleterious⁹; in that regard, more research is necessary. Overall, the authors' concept proves an important one for the

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Disclosures: The authors reported no conflicts of interest.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

Received for publication Oct 26, 2020; revisions received Oct 26, 2020; accepted for publication Oct 27, 2020; available ahead of print Nov 5, 2020.

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J Thorac Cardiovasc Surg 2022;163:709-10

0022-5223/\$36.00

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<https://doi.org/10.1016/j.jtcvs.2020.10.111>

cardiac surgical community, helping with heart team discussions through a better understanding of the potential of CABG in preventing myocardial infarction, and suggesting practice changes to enable the life-prolonging effect of surgical collateralization.

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Commentary: The coronary artery bypass grafting advantage: Fake assertion or obvious reality

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Coronary artery bypass grafting (CABG) is an enduring procedure that has existed for more than 5 decades. The routine use of the internal thoracic artery (ITA) to bypass the left anterior descending (LAD) artery was fueled by a high profile article in 1986 that associated its use with superior graft patency and patient survival when compared with vein grafts.¹ The article was based on an observational study, not a randomized controlled clinical trial (RCT), but the results were decisively in favor of the ITA.

With regard to the comparative effectiveness of different treatments for coronary artery disease (CAD), Doenst and Sigusch² point out that RCTs with long-term follow-up

A patent left internal thoracic artery graft to the left anterior descending artery as the sole blood supply to the entire heart.

CENTRAL MESSAGE

Coronary artery bypass could offer future protection against myocardial infarction by offering an alternative pathway for blood that is unhindered by upstream native coronary disease.

have demonstrated superiority of CABG over medical management and percutaneous coronary intervention (PCI) in patients with significant atherosclerotic burden. They propose surgical collateralization as an explanation for CABG's edge over PCI. The premise here is that bypass grafts deliver blood beyond the proximal coronary segments that are usually diseased and are at risk for disease progression or development of de novo lesions.² Thus, in addition

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Disclosures: The author reported no conflicts of interest.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

Received for publication Oct 14, 2020; revisions received Oct 14, 2020; accepted for publication Oct 15, 2020; available ahead of print Oct 27, 2020.

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0022-5223/\$36.00

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<https://doi.org/10.1016/j.jtcvs.2020.10.070>