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Commentary: Minimally invasive direct coronary artery bypass for isolated left anterior descending lesions: A welcomed innovation

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Significant flow-limiting lesions of the left anterior descending (LAD) artery may lead to myocardial infarction and death.¹ The 2012 American College of Cardiology Foundation/American Heart Association revascularization guidelines provide a greater class of recommendation for coronary artery bypass grafting with the use of the left internal mammary artery (LIMA) (Class IIa) versus percutaneous coronary intervention (PCI) (Class IIb) to treat these isolated lesions.² Despite this, PCI is usually preferred by patients due to its decreased invasiveness and faster recovery. As well, in-stent restenosis has decreased with wide adoption of drug-eluting stent (DES) platforms.³ The invasiveness of coronary artery bypass grafting has been addressed through innovations to avoid sternotomy and cardiopulmonary bypass. Minimally invasive direct coronary artery bypass (MIDCAB), as described by the authors in this issue of the *Journal*, is one such technique. The LIMA is robotically harvested and the LIMA-LAD anastomosis is performed under direct vision via sternal-sparing mini-thoracotomy.⁴

Patel and colleagues⁴ compared the results of PCI with DES with MIDCAB in patients with isolated LAD lesions requiring revascularization. In a propensity-score matched analysis, there was no difference in 9-year survival in 158

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As surgeons, we must strive to innovate, to provide state-of-the-art treatment options for our patients. Patel and colleagues show that MIDCAB for isolated LAD lesions is a welcomed innovation.

well-matched patient-pairs. Nonetheless, the risk of repeat revascularization was greater with DES-PCI, which was strongly associated with smaller stent diameter. Counterintuitively, age was not a risk variable for mortality after MIDCAB but was for DES-PCI. Also, aggregate costs, which included the costs of repeat revascularization, were greater in the PCI arm, using the institution's financial system. Overall, these findings suggest that when performed in experienced hands, MIDCAB is a safe, minimally invasive alternative to revascularize the LAD with excellent long-term results.

However, this study must be interpreted in the context of some important limitations. Their single-center results with MIDCAB are not generalizable, inasmuch as most institutions do not have a robotics program. In addition, there is a learning curve with robotic surgery, leading to long procedural times with greater rates of adverse events in the beginning of the robotic experience.⁵ The surgical group at Lennox Hill is well past their learning curve. Furthermore, the upfront capital costs to set up a robotics practice are substantial. These may be reasons why MIDCAB is not widely adopted in the surgical community. The use of propensity-score matching can only adjust for measured baseline demographics but cannot adjust for unmeasured variables, including the ultimate physician decision of one therapy over another. Also, other important cardiac events were not reported. Finally, the study might be underpowered to show any clinical difference between techniques due to the small sample size.

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Nonetheless, we congratulate the authors on this timely analysis with extensive long-term follow-up. Overall, the outcomes were excellent with both approaches. Although current guidelines have a stronger recommendation for bypass surgery than PCI for isolated LAD disease, the findings of the ISCHEMIA (International Study of Comparative Health Effectiveness with Medical and Invasive Approaches) investigators suggest that an initial noninvasive approach is a reasonable strategy for many patients with stable ischemic heart disease.⁶ The decision to revascularize and the mode of revascularization for any individual patient should ideally be performed in a Heart Team setting, as was done in this study. Patel and colleagues illustrate that MIDCAB can be the procedure of choice, particularly for patients with nonfavorable lesion characteristics for PCI and if a patient has a long-anticipated life expectancy. As PCI options continue to evolve and improve, as surgeons, we must also strive to innovate, to provide state-of-the-art treatment options for our patients—this study by Patel and colleagues shows that MIDCAB for isolated LAD lesions is a welcomed innovation.

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Commentary: Is robotic-assisted coronary bypass ready for prime time?

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Minimally invasive direct coronary artery bypass (MID-CAB) has been plagued by challenges since its inception over 25 years ago. These center around its highly technical

Robot-assisted redo coronary bypass for LAD in-stent restenosis.

CENTRAL MESSAGE

Robot-assisted coronary bypass may have survival benefits over drug-eluting stents in older and obese patients with isolated, complex LAD stenosis.

nature: It can be challenging to harvest the entire internal thoracic artery and identify the left anterior descending (LAD) coronary artery via a minithoracotomy, and anatomic factors such as obesity, reoperation, and intramyocardial

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