



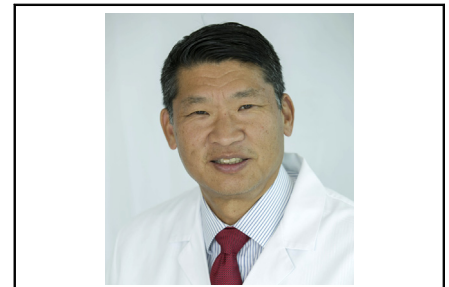
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Commentary: Almost ready for prime time

Lawrence M. Wei, MD

In this issue of JTCVS Techniques, Torregrossa, Amabile, and Balkhy¹ of the University of Chicago have elegantly demonstrated their technique of totally endoscopic coronary artery bypass (TECAB) with robotically sutured anastomoses. Balkhy and colleagues² have been pioneers in robotic coronary revascularization and have performed multivessel TECAB procedures using off-pump techniques, facilitated by a robotic coronary stabilizer and a mechanical anastomotic stapler. Because the anastomotic device is no longer produced, they developed and have reported in this issue their method of sewing coronary anastomoses robotically.

Since Loulmet and colleagues³ performed the first robotic coronary artery bypass operations on arrested hearts in 1999, the ability to perform multivessel, off-pump robotic coronary artery bypass grafting (CABG) has been an elusive goal. Most surgeons who have used robotic assistance for coronary revascularization have harvested the mammary conduits robotically and manually sewn the distal anastomoses, off pump, through a small thoracotomy. This approach has proved to be highly successful, with angiographic results reportedly equivalent to those of CABG via sternotomy but has been limited in the accessibility of distal targets other than the left anterior descending and diagonal arteries.⁴ Balkhy's team is among a very small number of surgeons who have performed the operation endoscopically, and they have extended the technique to



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CENTRAL MESSAGE

A dedicated, experienced team demonstrates how to perform robotically sutured coronary artery anastomoses, a technique that will be useful for a select group of surgeons.

performing multivessel robotic TECAB, off pump, with bilateral mammary arterial grafts.²

It has been more than 2 decades since the initial report of Loulmet and colleagues.³ However, among the millions of CABG operations since performed, very few have been robotic TECAB procedures, and only a fraction of these were off pump. The reported series of robotic TECAB have all been single-arm studies of selected patients and have not included long-term follow-up data. Many surgeons, even those with substantial robotic experience, have chosen not to pursue robotic TECAB. Others have attempted and then abandoned the approach. The technical difficulty in performing robotic coronary anastomoses spurred the development of mechanical devices to facilitate their construction; however, the device shortcomings and limited demand has led to their demise and the need to develop the intricate technique illustrated in their report. The authors' considerable ingenuity and perseverance will once again be tested in the near future because the small number of robotic TECAB operations being performed has led Intuitive Surgical, Inc (Mountain View, Calif) to discontinue manufacture of the robotic stabilizer used in the study by Torregrossa and colleagues.¹

Balkhy and colleagues^{1,2} are to be applauded for their efforts to develop the techniques of robotic coronary revascularization and for their persistence in achieving successful outcomes. However, the technical challenges and limited reproducibility of robotic TECAB has meant that, for the

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vast majority of surgeons, this operation will likely always remain in the holding pattern of being almost ready for prime time.

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