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Commentary: Destination zero stroke: Three steps, but one at a time

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Stroke is the most devastating complication of coronary artery bypass grafting (CABG)—many would say even worse than death! Its frequency, although reduced by advances such as preoperative computed tomography scans, epi-aortic ultrasonography, avoiding side-biting clamps, using connecting devices, and single-clamp techniques, is still 0.8% to 2%.¹ Avoiding the ascending aorta completely is a logical strategy, supported by mounting evidence.²

Vallely and colleagues³ offer a further, definitive advance toward completely eliminating stroke in CABG. They present the rationale (“why”). The “when” is logical. If there is a technique superior to others that one uses for the most challenging situations—the “hostile” aorta, it is rational to use this technique routinely rather than occasionally, and then attempt it in the most stressful situations. To master such a technique, one should use it often, as the default, and question why it should not be used. Necessarily, other strategies will be more appropriate for marked cardiomegaly, urgent situations, hemodynamic instability, etc.

The technical aspects of “how” are addressed by other articles and videos. The authors recognize the discomfort of many surgeons of having only one vascular input and base their techniques predominantly on the 2 in-situ internal thoracic arteries (ITAs) to guarantee a greater myocardial blood supply. Additionally, there is less chance of technical misadventure with

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CENTRAL MESSAGE

Total arterial, anaortic, off-pump coronary surgery. An amalgamation of 3 established techniques will reduce stroke and enhance prognosis. Wider uptake is required.

the left ITA, especially at the left ITA-Y anastomosis, and possible distortion, or vascular steal.

The main issue is the second part of the “how,” coupled with “who!” How to institute this operation widely, beyond a few centers? Vallely and colleagues³ propose the ideal operation with 3 components to achieve all the goals of myocardial revascularization—zero mortality, through avoiding cardiac ischemia, zero stroke by avoiding the aorta, the source of emboli, and the best long-term outcomes through total arterial revascularization.

Some would argue that as stroke rates are only 0.8% to 2%, further reduction may well be offset by reduced graft patencies, incomplete revascularization as seen with off-pump CABG (OPCAB), and a multitude of learning curve mortalities and morbidity. However, these arguments do not preclude trying and achieving.

Three hurdles need to be overcome: procuring and using multiple arterial grafts including both ITAs and radials, adoption of OPCAB techniques, and complex reconstructions with the ITAs and radials. Although each is well established in its own right, it is a matter of combining them! Thus far, these are 3 bridges too far for many surgeons, as the uptake of OPCAB is low, multiple arterial grafting is <10% in most countries, and anaortic techniques are uncommon.⁴

As CABG will continue to be the most common operation performed by cardiac surgeons, all cardiac surgeons should

be trained in such techniques rather than having a “subspecialty” of coronary surgery.⁵ For anaortic techniques to have traction, specific programs need to be devised and “owned” by our professional associations. Methods to achieve this are addressed by the authors, especially more comprehensive training, adopted incrementally, in all aspects of CABG. Realistically, most surgeons will not adopt these techniques unless they have seen them, performed them under supervision, and become comfortable with them.

A way forward may be for the professional societies to fund surgeons for periods of at least 3 months to attend centers at which anaortic techniques are standard, learn and perform these operations under guidance, then return to their institution, invested in the benefit of these techniques so that they may institute them and teach them to others.

Only with such encouragement and planning will we be able to cross each of these 3 bridges—total arterial, off-pump, and anaortic—for the benefit of our patients.

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