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Commentary: Coronary endarterectomy: An old craft remastered

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Enhanced standards of living and longevity have been paradoxically accompanied by greater morbidity from conditions such as diabetes, obesity, peripheral vascular disease, and coronary artery disease. Coronary disease is more extensive, complex, and often diffuse, especially in patients with diabetes, providing challenges to any form of revascularization.¹

The account of coronary endarterectomy (CE) by Nishigawa and colleagues² is an important and timely reintroduction of and advocacy for an unfamiliar but sometimes necessary procedure that addresses the problematic scenario where the coronary disease is extensive but also so diffuse that it is beyond the scope of standard coronary artery bypass graft (CABG) techniques.

CE practiced in the 1960s and 1970s, and occasionally later, was accompanied by relatively high perioperative myocardial infarction and mortality: Up to 14%.³ Hence a reluctance for its widespread adoption. It was supplanted by the more predictable CABG procedure. The modern era has also seen the progressive, extensive, and sometimes inappropriate use of stents (including in patients with diabetes) such that internal coronary full metal jackets have sometimes been created. In-stent stenosis of these has

CENTRAL MESSAGE

Long, open LAD endarterectomy with a long LITA onlay patch reconstruction is emerging as an important technique to address severe diffuse disease or stenosed long/multiple stents.

created a new pathology and the need for solutions for patients experiencing unrelenting angina.

When angina is uncontrolled, and if traditional CABG is not an option in these scenarios, the technique of CE described by Nishigawa and colleagues² can provide a solution, especially to the left anterior descending artery (LAD). It is a masterful exposé of a forgotten craft. So, what has improved and changed to make this technique safer and worthy of being learned and used when required?

The authors incorporate these improvements in the methodical description of their technique (and provide a detailed account of their anticoagulation regimen, a significant factor in avoiding potentially catastrophic acute graft thrombosis).² These improvements include:

- Better myocardial protection that allows unhurried, deliberate, exact, meticulous endarterectomy and reconstruction of the artery whether on or off pump.
- Open, long endarterectomy as opposed to closed blind CE. There is deliberate extraction of the core from the septals and diagonals, and tacking down of the distal margin to prevent distal dissection and/or intimal intussusception.
- Careful washing of the residual LAD wall and attention to irregularities or flaps on the residual raw neointimal surface under direct magnified vision.
- Use of the skeletonized left internal thoracic artery (LITA) graft and long LITA onlay patch technique, so

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that a large portion of the LAD vascular wall is now LITA, possibly resulting in higher levels of nitric oxide being constantly released.

- Transient time flowmetry to check graft patency before leaving the operating room.
- Greater attention to, and the introduction of, new anticoagulant and antiplatelet agents to better safeguard against postoperative graft thrombosis until complete LAD reendothelialization occurs by 12 months, so that anticoagulation therapy can be stopped and the patient continued with just aspirin.

These incremental steps have been transformative; now CE can be performed with low perioperative myocardial infarction and mortality rates.

The authors use their experience of LAD CE in 233 patients, including 24 LAD stent removals, whilst achieving 4.5 distal anastomoses per patient, with a 0.9% perioperative mortality, 97% 1-year patency rate, and a 90%

5-year survival as the basis of their advice. This is substantially better for patients than just declaring the LAD (and hence the patient) inoperable.

The results achieved are a testament to surgical skill, attention to detail, and refinement of techniques over the years. They can and should be learned and applied by coronary surgeons. Long, open, direct-vision CE for an otherwise ungraftable diffusely diseased or stented LAD should be within the armamentarium of all coronary surgeons.

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