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## Commentary: To revise or not to revise, that is the awkward question

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### CENTRAL MESSAGE

What is the optimum decision when an angiogram shows a defect in revascularization?

Winter and Halkos<sup>1</sup> report a case of poor flow distal to the left internal thoracic artery-left anterior descending (LITA-LAD) anastomosis seen by completion angiography after robot-assisted coronary artery bypass grafting (CABG), which later demonstrated good filling of the target vessel, the LAD, after 12 months of conservative management. Their robot-assisted CABG consisted of the robotic-assisted LITA harvesting and a direct LITA-LAD anastomosis via a 3- to 4-cm nonrib-spreading minithoracotomy. The advantages of this procedure include establishing the LITA-LAD anastomosis, sparing the sternum, less postoperative pain, fast recovery, excellent cosmesis, and perhaps greater appeal to cardiologists and patients. However, the potential weaknesses include high technical demand, limited exposure of the LAD, and limited freedom of access in the region of the target anastomotic site. Limited exposure of the heart may lead to inadvertent grafting to the wrong target vessel(s). Also, intraoperative graft assessments by transit time flow measurement and intraoperative fluorescent imaging are of limited use due to narrow access. Therefore, intraoperative angiography in a hybrid suite would seem the most reliable applicable confirmation method. In the authors' previous report,<sup>2</sup> intraoperative angiography in a hybrid suite was done in only 20% of cases (63 out of 307). I wonder if their decision making for or against graft revision is the same when an angiogram is performed intraoperatively or after the operation.

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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 April 5, 2020; revisions received April 5, 2020; accepted for publication April 8, 2020; available ahead of print May 1, 2020.

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JTCVS Techniques 2020;3:194-5  
2666-2507

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<https://doi.org/10.1016/j.jtc.2020.04.012>

There is a report that intraoperative graft failure occurs in up to 4% of grafts during CABG without cardiopulmonary bypass.<sup>3</sup> The authors are to be congratulated for the clinical outcome of their lucky case. However, readers may find it difficult to differentiate such lucky cases from more problematic cases only from the information in this report. I am afraid that excessive optimism by readers might broaden the problem related to grafting quality in minimally invasive CABG.

Graft occlusion and poor graft flow may arise from various causes: technical errors in stitching, kinking, or twisting of the graft, vasoconstriction of the graft or target vessels, dissection or hematoma of the ITA, and dissection or flap formation caused while snaring a coronary artery or inserting an intracoronary shunt tube. In addition, chronic total obstruction (CTO) of the LAD needs special attention. CTO can create a tricky silent artery. Because collateral circulation has commonly been developed from other coronary territories, any ischemic signs may not become obvious when the graft to the CTO vessel is occluded. Due to the scarcity of relevant data, we remain uncertain about how to reach an optimum decision when an angiogram shows a defect in revascularization. I believe that more intraoperative graft confirmation needs to be performed in every single patient, especially when technically demanding minimally invasive CABG is performed, and collective data can warrant future sophisticated decision making. I am grateful to Winter and Halkos<sup>1</sup> for attracting the attention of our readers and raising awareness of the interpretation and meaning of completion angiography in robot-assisted CABG.

**References**

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