Off-pump coronary artery bypass grafting: Do it often, do it well, and do it completely—or don't do it at all

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Although it is generally accepted that coronary artery bypass grafting (CABG) is preferred to percutaneous coronary intervention in patients with diabetes and multivessel coronary artery disease,¹ the choice of on-pump versus off-pump CABG remains controversial.² In this issue of the *Journal*, Benedetto and colleagues³ publish a comparison of a large group of patients with diabetes (N = 2450) who underwent isolated, first-time CABG for multivessel disease with either off-pump or on-pump technique at a single center (Bristol Heart Institute) during a 19-year period.

Propensity matching was used, and 995 pairs were compared. There was no difference in early or late mortality between groups; however, morbidity (risk of cerebrovascular accident, postoperative intra-aortic balloon pump placement, and reexploration for bleeding) was reduced in patients undergoing off-pump CABG relative to those undergoing on-pump CABG.

Unfortunately, little information can be gleaned regarding the benefit of the use of arterial grafts in these patients. The use of bilateral internal thoracic artery grafting was low (only 2.8 % of on-pump and 1.8% of off-pump procedures), although 42% of the patients in both groups were obese. Of note, patients undergoing off-pump CABG had higher left internal thoracic artery use (93%) and radial artery use (21.3%) than those undergoing on-pump CABG, whereas the on-pump group had a higher rate of saphenous vein graft use (92.5%). One is thus left wondering whether any long-term benefits derived from more arterial grafting in the off-pump group influenced the observed conclusions.

The study is retrospective, with all of the attendant drawbacks (no matter what statistical “hoops” that Benedetto and colleagues³ may have jumped through). These include inherent surgeon preference bias for type of procedure chosen, lack of complete data set (cause of death, blood transfusion use, length of stay, pneumonia, prolonged intubation, graft patency, and need for revascularization).

Despite these limitations, Benedetto and colleagues³ are to be commended for their results. They clearly do off-pump CABG well. Half of the patients in the total group

Excellence in off-pump CABG surgery requires practice and complete revascularization. (Interpretation of quotation by Aristotle by Will Durant. Image source: <http://rebrandlive.com/strive-for-excellence/>.)

Central Message

Benedetto and colleagues demonstrate in a large population of patients with diabetes and multivessel CAD that off-pump CABG has morbidity benefits and equivalent survival relative to on-pump CABG.

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were operated on with off-pump techniques; a large percentage of patients could be matched (91% of off-pump and 96% of on-pump), suggesting fairly similar groups; and the off-pump surgeons were experienced (conversion to on-pump was only 0.6%). Off-pump CABG is often touted as a technique that benefits high-risk patients the most (women, patients with diabetes, etc), and experienced off-pump surgeons are best equipped to operate on these patients. Similar to other technically demanding procedures for which volume has been shown to influence outcomes, perhaps centers of excellence should be developed for off-pump CABG.

Small, diabetic vessels are often the feature that steers the surgeon away from off-pump techniques or leads the less experienced off-pump surgeon to avoid grafting the smaller vessels. In the study of Benedetto and colleagues,³ fewer grafts per patient were performed in the off-pump matched group, and the off-pump group had higher rate of incomplete revascularization than the on-pump group (14% vs 7.4%, respectively). Benedetto and colleagues³ noted that off-pump CABG was associated with a 7% absolute risk of incomplete revascularization, and incomplete revascularization was associated with a nearly 50% relative risk of increased late mortality.

Thus if you are going to do off-pump CABG, do it often, do it well, and do it completely (graft every ischemic area). With these caveats, the study of Benedetto and colleagues³

would then suggest that morbidity will be reduced and mortality will be equivalent to that with on-pump techniques.

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