Does the Cardiac Surgeon Accept Coronary Artery Bypass Grafting With Incomplete Revascularization for Patients With Low Ventricular Function and Complex Multivessel Coronary Disease?

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Coronary artery bypass grafting (CABG) has been proven to improve life expectancy and achieves much better results than percutaneous coronary intervention, especially in patients with multivessel disease, complex coronary lesions with high Syntax score, diabetes mellitus, and low cardiac function.

In contrast, the quality of anastomosis in CABG influences mid- and long-term survival. To achieve high-quality anastomosis, using the internal mammary artery (IMA) to the left anterior descending artery (LAD) as a graft conduit is extremely effective in both relieving pain and saving life. In addition, CABG with all arterial grafts may be more beneficial in the long-term than that with artery and vein grafts, even though it has not been proven yet. Regarding the number of anastomosed sites for 3-vessel disease, ≥3 anastomoses may be better than ≤2 for long-term survival. It is not clear, however, whether there is a difference in surgical outcome between 3 and ≥2 anastomoses.

In addition, regarding the priority of diseased coronary arteries to be revascularized, the LAD is top priority, of course. Second is the left circumflex artery (LCX), followed by the right coronary artery (RCA) in terms of left ventricular (LV) function. Regarding long-term survival after incomplete revascularization for patients with non-revascularized zones, however, incomplete LAD is worst, and the LCX is better than the RCA or similar if the LAD is protected by IMA. Moreover, the more severe the cardiac function is in chronic diseases such as myopathy in preoperative patients, the lower the rate of improved LV function, even after CABG, while most patients with preserved cardiac function (i.e., ejection fraction [EF] >35%) recover to much more or normal after CABG. Therefore a comparison between CABG with complete revascularization (CR) and that with incomplete revascularization (IR), such as that in the Lee et al study in this issue of the Journal, as well as in similar studies, should focus on how to improve coronary flow and, especially in patients with low cardiac function, how to improve cardiac function after revascularization. Such data, however, are not available as yet. Degree of recovery of left cardiac function definitely affects long-term outcome in the patients with preoperatively low cardiac function. In addition, patients with highly complex multivessel disease and low cardiac function may already have a high morbidity rate before operation. This could also be one of the reasons for the controversy that still exists in the comparison between CR and IR in previous studies. Until now, we could not conclude that CABG with CR in the patients with low ventricular function is more effective in the long term than that with IR, even though CR for the patients with normal ventricular function has been proved to be effective. Therefore, matched pair analysis in terms of preoperative comorbidities is required.

In this issue of the Journal, Lee et al investigate whether CABG with CR provides better long-term results than IR in patients with low cardiac function (EF <35%) and coronary artery 3-vessel disease. They analyzed 2 sets: raw data; and propensity score-adjusted data. It is the first report to compare CABG with CR and that with IR using propensity score adjustment in patients with low cardiac function. A similar study reported significantly different early and long-term mortality rates, including cardiac death but not major adverse cardiac and cerebral events (MACCE), between CR and IR in an analysis of all patients without adjustment. That study, however, also noted that an initial drop in freedom from all-cause death and cardiac death immediately after CABG was larger in the IR than the CR group, and that at 1 year after operation the decrease in the CR and IR groups was almost identical. In contrast, Lee et al reported significantly different results in all-cause mortality, cardiac death, and MACCE between CR and IR from all patients with a small drop in the initial period after operation. It is somewhat disappointing, however, that CABG with CR was better than IR only regarding freedom from MACCE in the propensity-matched cohort. The readers of the Journal can see, however, that there is a consistent tendency for CR to be higher in freedom from cardiac death and all-cause death than IR, especially at 5 years postoperatively, in both studies. Further studies...
with larger sample sizes and a longer duration of observation are required. In the conclusion section, Lee et al were not able to present sufficient evidence to warrant CABG with CR. To do so, further study is required, focusing on how cardiac function recovers after CABG between CR and IR in patients with poor cardiac function. Such a study may provide a final answer as to which is more effective: CR or IR. The results from the Lee et al study, however, may still encourage cardiac surgeons to perform CABG with CR. The study definitely has merit, and is worthy of the Journal’s readers, whom I am sure deeply appreciate the hard work of Lee et al.

Disclosures

The author declares no conflicts of interest.

References