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Editorial

Time for Judicious Application of Off-Pump CABG

CORONARY ARTERY disease (CAD) is a major cause of death worldwide, and it is estimated that it will cause more than 360,000 deaths annually in the Unites States.[1] Surgical coronary artery bypass grafting (CABG) is the gold standard for revascularization of left main or three-vessel CAD.[2] However, even after 6 decades of its existence, whether the type of surgery should be off-pump (OPCAB) or conventional CABG with cardiopulmonary bypass remains unresolved. By circumventing the cardiopulmonary bypass, OPCAB is expected to improve long-term outcomes by decreasing the cerebrovascular complications, perioperative myocardial injury, and cardiac related mortality. Consequently, the early 2000s witnessed a dramatic increase in OPCABs.

The initial trials comparing the 2 techniques were not conclusive and reported mixed results. The major concern about OPCAB is related to graft patency. A recent updated meta-analysis has concluded that graft patency is poorer with OPCAB.[3] Likewise, in a large-scale Korean patient cohort, it was shown that OPCAB is associated with higher long-term risk of mortality, myocardial infarction, and repeat revascularisation.[4] These results substantiated the earlier belief that primary perioperative benefits of OPCAB are outweighed by the risk of ineffective revascularization.[5] Therefore, OPCAB has fallen out of favor, and, currently, in the United States and Europe, OPCAB is used only in about 20%-to-25% of patients.[6] It was even suggested that OPCAB should be considered a safe alternative in patients who lack significant circumflex-based CAD.[5] Such patients are likely to have 1- or 2-vessel disease for which percutaneous coronary interventions are preferred. Does this mean that time has come to write an obituary for OPCAB? This is indeed a moot question that needs to be delved into further, as OPCAB can offer certain benefits (that the conventional CABG cannot) to a select group of high-risk elderly patients who are more likely to have comorbidities.

A few meta-analyses in elderly patients have confirmed that OPCAB offers benefits or at least equivalent results (hospital mortality and survival at 6 months and 1 year) as compared with conventional CABG.[7,8] Likewise, in a randomized controlled trial of patients with EuroSCORE >6, Lemma et al. showed that operative mortality, myocardial infarction, stroke, renal failure, reoperation from bleeding, and acute respiratory distress syndrome within 30 days postoperatively (composite end-point) were significantly lower in the OPCAB group.[9] Another randomized controlled trial has revealed comparable early results,[10] and observational studies have reported lower incidence of stroke with no difference in 1- and 5-year survival rates.[11,12] There is a body of evidence in the literature demonstrating beneficial results in dialysis-dependent chronic kidney disease patients. More recent literature has echoed similar results, and has concluded that the high-risk group of patients seem to benefit from OPCAB.[13] In redo surgeries, and in patients with poor left ventricular function, OPCAB offers early survival advantage and similar long-term mortality.[14,15] These reassuring results indicate the role of OPCAB in a select high-risk elderly population.

OPCAB is not an easy surgery, and it is acknowledged that it involves a great deal of surgical dexterity and skill.[6] In addition, adequate support from other team members, especially the anesthesiologists, is vital in defining the optimum results. The hemodynamic instability during the procedure can contribute toward compromising the quality of anastomosis, as well as decreased cerebral perfusion, which can influence the outcome. In other words, the benefits of OPCAB can only be seen if an expert team performs the surgery. In a propensity-matched study, it was shown that the long-term outcomes in higher-risk patients undergoing OPCAB (by experienced surgeons) was comparable to lower-risk patients undergoing conventional CABG.[16] A qualitative difference in outcome in high-volume versus lower-volume centers was indicated in the report by Park et al.[4]

There is considerable enthusiasm among the Asian countries (Japan, India, and South Korea) to perform OPCAB, with 50%-to-75% of patients undergoing OPCAB. However, if the rates of OPCAB decline, the number of trained personnel available to perform this surgery also will decrease. This can be a limiting factor toward conducting future trials; but, more importantly, it also would reduce the number of expert teams available to perform this technically challenging surgery.

In summary, discontinuation of OPCAB under the garb of poor long-term outcome appears inappropriate. Selection of deserving patients to undergo surgery by an expert team is the way forward. This would entail creation of specialized and supervised structured training programs in the right environment that would help to set up and strengthen the OPCAB programs at various centers. In addition, policies should be framed for prioritizing and allocation of patients to appropriate

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centers. Afterall, is it not our responsibility to ensure that the sick and elderly patients are not denied the benefits of this surgery?

Declaration of Competing Interest

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