

Which Procedure, or Which Patient?

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Coronary artery bypass surgery without the use of cardiopulmonary bypass (off-pump coronary artery bypass, or OPCAB) had increased dramatically in the 1990s after the introduction of various kinds of epicardial stabilizers. It had been postulated that this strategy would decrease perioperative morbidity and mortality by eliminating cardiopulmonary bypass and cardioplegic cardiac arrest, with significant concern about the quality and quantity of coronary anastomoses due to surgical difficulties.

With the publication of myriad clinical studies in the 2000s, some of the postulations had been proved, some denied, while some remained controversial. Prospective, randomized trials showed only small differences in operative outcomes in which most high-risk patients were excluded. Observational studies showed greater differences in short-term results, but analyses of these reports were complicated by patient selection. Follow-up studies, however, both randomized and observational, showed inferior long-term outcomes after OPCAB in terms of decreased graft patency, increased risk of re-intervention, and decreased survival.¹⁻⁴

It had been hoped that OPCAB might decrease the risk of perioperative morbidities of stroke, renal function impairment, and inflammation/infection. It is now evident that OPCAB is beneficial for patients of old age, especially those with a high risk of stroke. Patients with a porcelain aorta may be best revascularized with OPCAB techniques. Patients with liver failure or cirrhosis may also benefit from OPCAB for less derangement of coagulation function. This technique may decrease the need for perioperative transfusion, and lower the serum

levels of inflammatory cytokines, but the evidence of its role in prevention of perioperative kidney injury is limited in large-scale studies.⁵

It is now generally accepted that not either surgical strategy alone is better than the other, but specific patient subset may benefit from specific surgical approach. So the direction in which our research needs to go from now on, is the identification of patient subsets in which major differences in outcomes exist based on surgical strategy.⁶

From this point of view, the article by Chen et al.⁷ in the current issue of Acta Cardiologica Sinica is of great interest to our readers. The procedure of on-pump beating-heart (OPBH) coronary artery bypass was introduced since 2000s as an alternative for unstable patients undergoing coronary artery bypass grafting (CABG), and had attracted much attention in the past 10 years for its possible protective effects from perioperative morbidities. Meta-analyses showed that OPBH technique might decrease the risk of perioperative myocardial infarction, renal failure, and low cardiac output syndrome or the need for mechanical circulatory support.^{8,9}

Chen et al. reported lowered incidences of acute kidney injury within 7 days and loss of kidney function at 1 year in patients undergoing OPBH coronary artery bypass surgery as compared to conventional CABG. They hypothesized that this technique provided pulsatile flow to the circulatory system, shortened duration of cardiopulmonary bypass, and decreased the release of free radicals resulting from ischemic reperfusion injury during cardiac arrest, all of which helped to preserve the renal function. However, whether the effects apply to all patients undergoing CABG or it would yield a significant benefit in only a specific subset of patients remained unanswered and needs further investigation.

Received: June 21, 2017

Accepted: June 26, 2017

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