

Recent Advances in CABG

kyung-Jong Yoo (유경종)

연세대학교 의과대학, 세브란스 심장혈관병원

The gold standard for multi-vessel coronary revascularization continues to be coronary artery bypass grafting (CABG). As the development of operation techniques and devices, many modalities in the field of CABG was introduced and the outcomes have been improved in spite of the higher risks of patients than past.

1. Off-pump Coronary Artery Bypass (OPCAB)

Over the past 20 years off-pump coronary artery bypass grafting (OPCAB) has been increasingly used because of the increased awareness of the deleterious effects of cardiopulmonary bypass (CPB) and aortic manipulation. Evidence suggests that there was no significant difference on hospital mortality or perioperative myocardial infarction in comparison to on-pump CABG, but OPCAB reduces the incidence of post-operative stroke by about 30 %. According to mid and long-term outcomes, OPCAB and On-pump CABG showed equivalent results on graft patency rates, incidence of recurrent or residual myocardial ischemia, need for re-intervention, and long-term survival. Especially in the high-risk patients, OPCAB has improved neurological outcomes and the benefit of OPCAB may be more apparent for complications associated with CPB and aortic manipulation.

2. Hybrid coronary revascularization (HCR)

Hybrid coronary revascularization (HCR) is a recently introduced, minimally invasive option for patients requiring revascularization for coronary lesions. This technique utilizes a combination of minimally invasive direct CABG for left anterior descending (LAD) lesions and percutaneous coronary interventions for non-LAD coronary lesions. The rationale for HCR lies in the well-

established survival benefit conferred by LIMA-to-LAD grafts and the use of new stent platforms featuring lower stent restenosis and thrombosis rates compared with venous graft stenosis and occlusion rates, respectively. Recent meta-analysis (Phan K et al, IJC 2015) showed no difference in procedural outcomes between HCR and CABG. However, HCR procedure had a significant risk of repeat revascularization at non-LAD lesions.

3. Robotic coronary revascularization- Totally endoscopic coronary artery bypass (TECAB)

Robotic CABG is a minimally invasive alternative for patients who had single or multi-vessel disease. Since the first closed-chest robotic CABG on an arrested heart, robotic coronary bypass surgery has been gradually gaining popularity with the potential advantage of less trauma and rapid postoperative recovery over the last 15 years. Both left and right internal mammary arteries (IMAs) could be harvested on the same side of a patient. Robotic CABG is known to have comparable short and long term results compared to conventional CABG and a lower reintervention rate compared with PCI. More encouragingly, robotic CABG is likely to reduce postoperative complications in patients with single-vessel disease.

4. Concomitant CABG and Stem cell therapy

Stem cell therapy has drawn attentions to treat ischemic heart disease since late 1990. Though many researches are ongoing and there is a debate about the delivery methods of stem cells to the failed heart and, direct injection to the myocardium might be the most effective way. The most recent meta-analysis (Qin et al, CAD 2015) showed that not only did stem cell transplantation significantly improve LVEF (OR =11.7, 95% CI: 4.04-19.36; P=0.003) but it also significantly reduced the left ventricular end-diastolic volume and left ventricular end-systolic volume (P<0.001).

