Heart Team Approach for Patients With Unprotected Left Main Coronary Artery Disease

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Patients with unprotected left main coronary artery disease (LMCA) have a worse prognosis than any other form of coronary artery disease (CAD). During the past decade, the efficacy and safety of percutaneous coronary intervention (PCI) vs. coronary artery bypass grafting (CABG) for LMCA have been major topics for both interventional cardiologists and cardiac surgeons. CABG has been considered as the standard treatment modality for these patients, but as stent design, procedural technique and adjunctive medical therapy have improved, PCI has emerged as an alternative treatment option. Accordingly, PCI with stenting for LMCA was upgraded to a class IIa recommendation for properly selected patients in the 2012 guidelines of the United States. However, selection of optimal treatment for these patients remains controversial because of different clinical decision pathways and complicated evaluation of coronary anatomy and morbidity at the time of intervention.

Prospective randomized studies, as well as large registry studies and meta-analyses, have been performed to answer this important question. A German prospective randomized study indicated that although rates of the composite safety endpoint (death/stroke/myocardial infarction [MI]) were similar between the groups, the incidence of major adverse events (MACCE: death from any cause, stroke, MI or repeat revascularization) was significantly higher in the PCI group as compared with the CABG group. In contrast, the SYNTAX trial indicated that both safety (death/stroke/MI) and efficacy endpoints (MACCE) were similar between the PCI and CABG arms up to 3 years post-intervention. In both studies, however, an increased rate of repeat revascularization was observed in patients with PCI and stroke was significantly more likely to occur with CABG. This is particularly true in patients with a high SYNTAX score (>33). In another words, the complexity of the coronary anatomy (ie, higher SYNTAX score) was involved in the worse outcome in the PCI arm whereas the outcome of CABG did not correlate with baseline SYNTAX score. For CABG candidates, comorbidity (calculated by EuroSCORE or STS score) rather than complexity of the coronary anatomy (determined by SYNTAX score) significantly predicted outcomes after surgery.

In a large registry study comparing first-generation drug-eluting stents vs. CABG in multivessel coronary disease, CABG was associated with lower rates of death or MI and repeat revascularization. the MAIN-COMPARE registry for LMCA indicated that PCI showed similar rates of mortality and safety endpoint (death/stroke/MI) as compared with CABG, but higher rates of repeat revascularization up to the 5-year follow-up. Randomized control trial (RCT) vs. registry study has different advantages and disadvantages. The lack of randomization results in only moderate internal validity associated with attrition, performance and detection biases. In contrast, registry studies have the advantage that they represent a typical patient population spectrum, free of the selection biases involved in randomized trials.

Interestingly, meta-analyses of both RCT alone and a combined RCT/prospective registry/retrospective study had similar results, which indicated that PCI had similar 1-year rates of MACCE, death and safety outcomes, but a lower risk of stroke, and a higher risk of repeat revascularization as compared with CABG. This is especially prominent in patients with high SYNTAX score (>33) and/or patients with LMCA plus 3-vessel disease.

Lessons learned from these studies are numerous, as follows. (1) Stroke remains the significant morbidity of CABG as compared with PCI in the majority of RCT, registry and meta-analysis studies, the primary difference in stroke rate between the PCI and CABG groups may be related to the difference in early stroke. During on-pump CABG, the use of cardiopulmonary bypass and manipulation of the ascending aorta may increase the incidence of stroke immediately after surgery. In fact, a comparative study of off-pump vs. on-pump CABG indicated that clampless off-pump CABG lowers mortality, stroke, and MACCE rates. A meta-analysis of the last 10 years, published in this issue of the Journal, reports that only 30% of CABG was performed using an off-pump technique. Because over 60% of CABG is undertaken using an off-pump technique in Japan, it is interesting to know whether off-pump CABG may reduce the risk of stroke in patients with LMCA. A randomized study or large registry study comparing PCI vs. off-pump CABG is necessary.

(2) Both the complexity of CAD (ie, SYNTAX score) and comorbidity (calculated by EuroSCORE or STS score) has a significant effect on early and late outcomes in patients undergoing PCI, whereas only the EuroSCORE, not the SYNTAX score, predicts outcomes after CABG for patients with LMCA.

Because selection of optimal treatment primarily depends on both the complexity of coronary anatomy and comorbidity of

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the patient, a heart team approach is ideal for deciding which procedure is the best for each patient. In fact, the 2012 guideline of the United States (Table) recommend a heart team approach as class I, even though the level of evidence was C. Unfortunately, this important decision making is sometimes performed only by the interventional cardiologists without adequate informed discussion with the patient. Some cardiologists have dismissed the guidelines because the PCI technique continues to evolve. They believe that the guidelines are outdated because the results were based on earlier techniques. The current clinical decision pathway may also lead to unilateral decision making because the “gate-keepers” of these patients are usually cardiologists. We have to remind ourselves that this is a complicated decision and patients need to be adequately informed regarding mortality, stroke, MI and angina as well as recovery time, medication and expected lifestyle after each procedure. Discussion between the multidisciplinary heart team and the patient before and after coronary angiography is recommended to further improve the outcomes and patient satisfaction after intervention for LMCA disease.

### References