Unprotected left main coronary artery (ULMCA) lesions are candidates for coronary artery bypass surgery because of the high risk of serious adverse periprocedural events and long-term complications associated with percutaneous coronary intervention (PCI). Although coronary stents have improved initial outcomes of PCI with coronary balloon angioplasty, the outcomes of coronary stenting in ULMCA remain mixed, even with the use of drug-eluting stents.1-7 Periprocedural safety and long-term outcomes are excellent in patients at low risk1-7; however, long-term mortality associated with ULMCA stenting is ~25% in patients at high risk.3 These variations have resulted in studies that evaluated factors influencing ULMCA stenting outcomes. The recent Unprotected Left Main Trunk Investigation Multicenter Assessment (ULTIMA) registry report involved 279 patients, 46% of whom were deemed inoperable or at high surgical risk.3 For the latter patients, the in-hospital mortality rate was 14%, whereas the 1-year incidence rates were 24.2% for all-cause mortality, 20.2% for cardiac mortality, and 9.8% for myocardial infarction (MI). In that study, decreasing left ventricular function (<30%) was inversely related to events. In contrast, for the low-risk ULTIMA registry subset of 89 patients, the 1-year actuarial death rate was 3.4% and the MI rate was 2.3%. Likewise, we reported that elevated baseline CRP levels before PCI were associated with a progressive increase in death or MI at 30 days (lowest quartile, 3.9%, versus highest quartile, 14.2%; P=0.002) levels were predictors of death, independent of traditional cardiac risk factors. The findings of this article are in line with emerging evidence that inflammatory biomarkers such as CRP are useful for identifying high-risk patients.9-11 Previous reports documented that high preprocedural CRP levels were associated with unfavorable long-term outcomes6-11 as well as poor initial procedural results.11 Chew et al reported that elevated baseline CRP levels before PCI were associated with a progressive increase in death or MI at 30 days (lowest quartile, 3.9%, versus highest quartile, 14.2%; P=0.002) in 727 consecutive patients.11 This finding was in agreement with another large population study of 1458 PCI patients showing an association between death or MI rate and CRP levels >3 mg/L (6.1% versus 1.5%, P<0.0001).6 The odds ratios for elevated CRP as an independent risk factor for death and MI were 3.66 and 3.71, respectively.

The Palmerini et al study extended the application of inflammatory markers, in particular in relationship to CRP and PCI of ULMCA lesions.8 Compared with other studies using low-risk ULMCA patients, this study included relatively high-risk patients, with 75% having acute coronary syndromes and 71% having elevated CRP levels (>3 mg/L). Therefore, despite a small study population of 83 patients, they identified an association between CRP levels and death or MI rate. Previously, high CRP levels were linked to worse clinical outcomes in studies that observed that coronary atherothrombosis was not limited to the focal culprit lesion but was diffusely involved12 or involved multiple plaque ruptures in the culprit and nonculprit lesions.13 We examined the incidence of multiple plaque ruptures using intravascular ultrasound examination of all 3 coronary vessels in patients with acute MI and stable angina.13 In that study, 17% of acute MI patients had ruptured plaques both in the culprit and nonculprit vessels. In addition, CRP was independently associated with plaque rupture in acute MI patients (P=0.035; OR, 2.139; 95% CI, 1.053 to 4.343).

The opinions expressed in this article are not necessarily those of the editors or of the American Heart Association.

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Editorial

Inflammatory Biomarkers for Prediction of Outcomes After Unprotected Left Main Coronary Intervention

Seung-Jung Park, MD, PhD
Taking into account the previous suggestion that in-stent restenosis at the ULMCA may be the main cause of long-term adverse cardiac events, the predictive role of CRP in ULMCA intervention may be explained by an association between CRP and restenosis occurrence. In contrast to the strong evidence of the relationship between CRP and death or MI rates, however, the association between preprocedural inflammatory markers and subsequent restenosis has been confusing. Some studies report that preprocedural CRP levels can predict late occurrence of clinical and angiographic restenosis, whereas others state that CRP levels are not associated with restenosis. Although the Palmerini et al study hinted at an association between CRP level and restenosis rate, this connection was not statistically significant. They found that restenosis rates in high- (>3 mg/L) and low-CRP level patients were 30% and 13%, respectively. Conclusive interpretation of this result was limited by the small study population, low angiographic follow-up rate (61%), and heterogeneity in the stents used (drug eluting and bare metal). Two recent studies failed to demonstrate an association between postprocedural CRP increase and restenosis rate after drug-eluting stent implantation, which contrasted with bare-metal stent implantation.

Data linking CRP levels and cardiac events will aid in identifying high-risk coronary intervention patients and assist in the selection of specific therapies that will reduce cardiac risk. Statin therapy may ameliorate the risk of adverse cardiac events such as periprocedural MI and long-term adverse cardiac events in patients with high preprocedural CRP. Moreover, recent evidence in regard to statin therapy for patients with high CRP levels. Statin therapy may ameliorate the risk of adverse cardiac events such as periprocedural MI and long-term adverse cardiac events in patients with high preprocedural CRP. Therefore, clinicians should be mindful of the value of preprocedural CRP measurement in ULMCA interventions.

In summary, this interesting study showed that preprocedural CRP measurement is useful in predicting outcomes of PCI for ULMCA stenosis. High preprocedural CRP levels were associated with unfavorable long-term outcomes with regard to death and death/MI. The data also suggested an association between CRP levels and restenosis rate. Despite the study limitations, the report adds valuable information to the clinician’s knowledge base. In ULMCA interventions, we should bear in mind information about systemic inflammation, in addition to patient and lesion characteristics. High systemic inflammatory activity based on CRP measurement or other biomarkers may assist in making decisions about both the revascularization strategy and adjunctive medication in ULMCA intervention patients.

References


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