Importance of Risk Stratification After Myocardial Infarction and the Need for Its Clinical Application

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Coronary artery disease, including myocardial infarction (MI), is still a major etiology of mortality and morbidity worldwide, although incidence and mortality are reduced recently in major developed countries. Among the preventive and therapeutic strategies, secondary prevention in patients with acute coronary syndrome and MI is of paramount importance.

Figure. Greater treatment effects in patients with a high TRS 2p score. In-hospital revascularization, Vorapaxar and simvastatin plus ezetimibe groups showed significantly improved clinical outcomes, especially high-risk patients (TRS 2P score >3). (A) Annual incidence of primary composite endpoint between revascularization groups (inpatients vs. non-inpatients). (B) Rate of CV death, MI or ischemic stroke at 3 years between vorapaxar and placebo groups. (C) Rate of CV death, MI or ischemic stroke at 7 years between simvastatin+ezetimibe and simvastatin alone groups. CV, cardiovascular; MI, myocardial infarction; TRS 2P, Thrombolysis in Myocardial Infarction (TIMI) risk score for secondary prevention. (A) Adapted from reference 4; (B) modified from reference 5; (C) modified from reference 6.

The opinions expressed in this article are not necessarily those of the editors or of the Japanese Circulation Society.

Received February 5, 2019; accepted February 6, 2019; J-STAGE Advance Publication released online February 28, 2019

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In this issue of the Journal, Huang et al\textsuperscript{4} investigate the usefulness of risk stratification using the Thrombolysis in Myocardial Infarction (TIMI) risk score for secondary prevention (TRS 2°P) in a real-world cohort of post-MI Chinese patients. As in previous large-scale randomized trials,\textsuperscript{5,6} current analysis showed that patients who survived MI were at high risk of subsequent major cardiovascular events, primarily driven by a high annual incidence of cardiovascular death and non-fatal MI, rather than non-fatal stroke. In the current study, there was a strong gradient of the primary composite endpoint (cardiovascular death, non-fatal MI, non-fatal stroke) stratified using the TRS 2°P score, especially cardiovascular death and non-fatal MI. Therefore, the diagnostic performance of the TRS 2°P score to predict a primary composite endpoint appears to be reasonable for clinical application. Even in the multivariate analysis including risk factors, treatments and others, the TRS 2°P score was one of the independent predictors for the primary composite endpoint and the risk of the primary composite endpoint was gradually increased by TRS 2°P score.

This is a worthy first study to validate the TRS 2°P for stratifying patients who survive MI for risk of recurrent cardiovascular events in a real-world clinical setting.

However, some important issues should be discussed. Compared with previous registries and 2 randomized studies,\textsuperscript{3,4} the rate of guideline therapy in this study was low and even patients with high TRS 2°P score had a lower rate of guideline therapy including aspirin, P2Y12 receptor inhibitors, statin and in-hospital revascularization rate compared with patients with a low TRS 2°P score. This low rate of guideline therapy in patients with a high TRS 2°P score may have led to the higher incidence of the primary composite endpoint compared with previous randomized trials.\textsuperscript{5,6} Of interest, the low use of aspirin, P2Y12 receptor inhibitors and in-hospital revascularization was an independent predictor of the primary composite endpoint. In the subgroup analysis, in-hospital revascularization significantly reduced the occurrence of the primary composite endpoint, especially in the high TRS 2°P score groups (Figure A). That result is consistent with a previous randomized study, which demonstrated that vorapaxar (protease-activated receptor-1 antagonist) or combination treatment with simvastatin and ezetimibe reduced the incidence of primary endpoint, especially in high TRS 2°P score patients, compared with placebo or simvastatin treatment alone (Figure B,C). Furthermore, the greater benefits were demonstrated in the higher TRS 2°P score groups.

Based on these findings, the TRS 2°P score can simply identify the risk of cardiovascular events in post-MI patients in real-world clinical practice. In addition, the study gives us more important information on the need for strong guidance on guideline treatment and intensive treatment, including statins and other lipid-lowering therapies,\textsuperscript{7} and revascularization in high-risk patients to improve clinical outcomes. It is time to act!

Conflict of Interest
Dr. Koh holds a certificate of patent, 10-1579656 (pravastatin+valsartan).

Funding
This work was supported by a grant from the Korea Health Technology R&D Project through the Korea Health Industry Development Institute funded by the Ministry for Health and Welfare, Korea (H115C0987 & HI14C1135) and the Korean Society of CardioMetabolic Syndrome.

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