Be Concise to Find the Candidate for Intensive Care – Importance of Risk Stratification of Ischemic Heart Disease –

Kazuya Takehana, MD, PhD

The screening and detection of coronary patients with subclinical disease who could potentially benefit from intensive primary prevention efforts is critically important. Enthusiasm for primary prevention and risk assessment in these people has been spurred by recent advances in prevention research.¹⁻⁴ Noninvasive testing for improved risk assessment has been greeted cautiously by critics, in part because of the inappropriate response to test results obtained from the cardiologic workup of these cases. In the clinical decision making, it is crucial to use such tests for patients with coronary artery disease (CAD). The goal of improved risk assessment is a more selective approach to the use of noninvasive cardiovascular investigations and of preventive interventions such as lipid-lowering agents, aspirin or angiotensin-converting enzyme inhibitors. It must be understood clearly that an abnormal noninvasive test result in an intermediate-risk person should be interpreted as yet another risk factor for a future cardiovascular event and not as a mandate for diagnosis of the presence or absence of angiographic CAD.

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Multislice computed tomography coronary angiography (CTCA) has been introduced into the field of cardiology in this era. With its high spatial resolution, noninvasive nature and relative ease of use, CTCA has evolved rapidly over the past decade to be an excellent imaging modality for direct, noninvasive anatomical assessment of the coronary arteries, which enables early detection of CAD. The current clinical guideline from the Japanese Circulation Society for noninvasive diagnosis of coronary artery lesions states that CTCA should be the first step in the workup of patients with intermediate risk on Duke stress score, if the institute has sufficient diagnostic ability and unceasing effort to reduce radiation exposure.⁵ In general, however, patients with a high risk for CAD have redundant risk factors for chronic kidney disease (CKD), such as being elderly, hypertension or diabetes mellitus (DM). We physicians therefore face the dilemma of using iodinated contrast media during CTCA for early screening of CAD in patients with considerable high-risk factors. Although CTCA has excellent diagnostic sensitivity for identifying coronary lesions, it cannot distinguish residual reduction of myocardial blood perfusion without higher radiation exposure. Also, previous study over time has shown that an anatomically significant lesion does not always equate with functional sig-

nificance, and nearly 50% of the significant lesions found on invasive coronary angiography or CTCA are not functionally relevant.^{6,7}

Myocardial perfusion imaging (MPI) is one of the best clinical tools for guiding physicians in the management of patients with not only suspected but also known CAD and can operate as the gatekeeper for determining therapeutic strategies. The background to this idea was proposed by Hachamovitch et al, who clearly demonstrated that patients will benefit from coronary intervention only when the amount of inducible ischemia of the left ventricle is greater than 10% on MPI.⁸ In the substudy of the COURAGE trial, the magnitude of residual ischemia on follow-up MPI was proportional to the risk for death or acute myocardial infarction (MI), regardless of treatment assignment, and a greater than 5% reduction in ischemia was associated with a significant reduction in risk.⁹ In addition, MPI does not require contrast agents, and the use of technetium-labeled radioisotopes causes relatively less radiation exposure than CTCA. Although ²⁰¹Tl causes a relatively higher radiation exposure because of its long half-life (72.9 h), ^{99m}Tc-labeled myocardial perfusion tracers are associated with relatively lower radiation doses because of their short half-life (6 h). Thus, most patients are able to have MPI even if they have other contraindications to CTCA, such as renal dysfunction, atrial fibrillation, uncontrollable tachycardia or allergies to contrast media. One of the exceptional instances in decision making for CAD patients is the person suffering excruciating angina symptoms with less myocardial ischemia and normal left ventricular function. Those borderline cases do not need further evaluation, based on these data, because one of the great features of stress MPI is its excellent negative predictive value for low mortality and fatal MI in patients with a normal stress scan. In clinical decision making, however, it is difficult to determine whether we should perform further invasive tests or invasive treatments for patients who have restricted their activities of daily life because of the presence of cardiac symptoms.

In this issue of the Journal, Nakajima et al address the estimation of cardiac events by MPI defect score and left ventricular ejection fraction in conjunction with the presence of CKD and DM.¹⁰ Multivariate logistic regression analysis was performed on 2,395 patients from a recent multicenter prognostic database (J-ACCESS) and major cardiac events were estimated by age, left ventricular ejection fraction, estimated glomerular filtration (eGFR) and presence of DM. The

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Division of Cardiology, Department of Medicine II, Kansai Medical University, Hirakata, Japan

Mailing address: Kazuya Takehana, MD, PhD, Division of Cardiology, Department of Medicine II, Kansai Medical University Hirakata Hospital, 2-3-1 Shin-machi, Hirakata 573-1191, Japan. E-mail: takehana@hirakata.kmu.ac.jp

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association of CKD and DM was the principal predictor of cardiac events and showed more consistent correspondence compared with those without eGFR estimation. They also create a risk table for coronary risk stratification in a Japanese population for easy clinical use in daily practice.

Although a similar risk table from the NIPPON DATA 80 assessed only traditional risk factors, such as age, systolic blood pressure, smoking, and serum total cholesterol and glucose levels,¹¹ the current study stratified the patients' risk for CAD by eGFR, the presence of DM and the magnitude of the inducible left ventricular ischemic area on the stress MPI in very concise risk-stratification tables. It is very important to emphasize that the prevalence of CKD is higher in Japan than in other Asian countries and the USA, although the morbidity of DM is less in Japan. Therefore, we have to use our own data from Japanese patients and should not refer to prognostic data from Western or other Asian countries.

From the series of analyses by the J-ACCESS investigators,^{12–15} we have now plenty of updated original Japanese data, including stress MPI, from the screening of stable CAD cases. Although a number of prognostic studies have been conducted in the USA and Europe, only a few multicenter studies have been performed in Japan.^{1,11,12} It is important to remember that all the data in those reports was based on Japanese patients who generally have a high intake of dietary salt but show relatively low cardiovascular event rates compared with Western countries.

Now, we have very convenient tools for the prediction of CAD. These tables should be on the desk in the clinic and shared in general to stratify CAD in the early stage to reduce the number of cardiac deaths in Japan.

Disclosure

None to disclose.

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